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Education in Emergency

ADAPTED CURRICULUM

&

PRIORTIZED CURRICULUM

KEY STAGE 5: CLASS XI - XII

Ministry of Education
Royal Education Council
Bhutan Council for School Examination and Assessment

Education in Emergency

ADAPTED CURRICULUM

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KEY STAGE 5: Classes XI - XII

May 2020

Ministry of Education
Royal Education Council
Bhutan Council for School Examinations and Assessment

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Acknowledgment

This curriculum resource is a joint effort of the Ministry of Education (MoE), Royal Education Council (REC) and the Bhutan Council for School Examinations and Assessment (BCSEA) towards facilitating the continuity of learning of our students under the emergency of COVID 19 virus pandemic.

This venture would not have materialized without the participation and contribution of various key players in the field of education. We commend the voluntary contribution of teachers from different schools in terms of their professional input in outlining and sequencing of curriculum content and learning objectives.

In this hour of emergency, we are thankful to our development partners like UNICEF, HELVETES, Save the Children for their continued support both professionally and financially. The education fraternity remains hopeful that our students gain the optimum benefit from the generous gesture and help us take education to greater heights in realising the national purpose of education.

Above all, the wisdom and blessing of the Government has been the impetus, which proved vital in rolling out numerous EiE programs and activities. Without the full support of policy makers and professionals in the country, there is little hope that the EiE outcomes are translated and materialized to fruition.

ISBN: ……..

FOREWORD

The detection of the first COVID-19 case on 5th March 2020 resulted in closure of schools and institutes in the proximal zone of Paro, Thimphu and Punakha. Subsequently, in compliance to the executive order of the Government, all schools and educational institutes in the country were closed from March 18, 2020 until the further notice.

The prolonged closure of schools is a great concern because it affects students' education and achievement of the expected learning outcomes for all key stages. It also poses unprecedented risk to safety, wellbeing and the developmental growth of students. Other secondary effects include increased anxiety and restlessness when they are removed from the routine and structured activities. Students are deprived of the nutrition supplements, which may cause nutritional imbalance, and there is also likelihood of children indulging in socially undesirable activities, teenage pregnancy and early marriage. Consequently, it has the potential to reverse the gains made in access to education and learning at risk because of the prolonged closure of schools.

Understanding the priority to facilitate the continuity of learnings, the Ministry of Education in collaboration with REC, BCSEA and relevant agencies have initiated a number of programmes and activities to roll out Education in Emergency (EiE). They include adaptation and prioritization of school curricula in making educational facilities and services accessible for all students. Diverse means of curriculum delivery are explored and deployed – broadcast media (TV & Radio), introduction of Google classrooms, use of social media to establish teacher-student-parent linkage for children's learning and engagement, and use of print in Self Instructional Materials (SIM) for curriculum delivery.

In-spite of the initiatives, owing to evolving COVID 19 pandemic in the regional and global scenario and the priority of the Government to help students progress to higher grade, guidelines on Assessment and Examinations for EiE curriculum is imperative. Assessment and examinations are crucial in ensuring the continuity of learning and preparing students to progress to higher grades through alternative forms of assessment and examinations.

Through this communique, Ministry of Education wishes to inform teachers, parents and students of the educational adjustment and modification in curricula, assessment and examinations, and instructions in helping students continue their education.

(Karma Tshering)
Officiating Secretary
Ministry of Education

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SCHOOL CURRICULUM FOR EDUCATION IN EMERGENCY

RATIONALE

The pandemic spread of COVID19 virus is ravaging every corner of the world indiscriminately with huge losses of lives. Understanding has been developed that senior citizens and people with low immunity system are vulnerable and pose the risk of contracting the effects. The World Health Organization (WHO) advices a few simple ways of dealing with the pandemic, which include social distancing, hand washing and use of hand sanitizer. Based on the risk of contracting the novel COVID virus and the impending danger to lives of youths, by the decree of executive order of the Government, all schools remain closed until further notice. However, the current scenario of rate and pace of spread of the virus does not appear that it can be contained any time sooner.

The prolonged closure of schools is continuing to impact students' education and achieving the expected learning outcomes for all key stages. Inevitably, this affects the progression of students to the next higher grade. Though the easiest way is to compel students to repeat in the same grade in the following year, the strategy is costly for the nation in all fronts, including financial expenses and learners' developmental progression, and may create generation gap in career opportunities.

According to INEE (2004), Education in emergencies, and during chronic crises and early reconstruction efforts, can be both life-saving and life-sustaining. It can save lives by protecting against exploitation and harm and by disseminating key survival messages on issues such as landmine safety or HIV/AIDS prevention. It sustains life by offering structure, stability and hope for the future during a time of crisis, particularly for children and adolescents. Education in emergencies also helps to heal the pain of bad experiences, build skills, and support conflict resolution and peace building. The emphasis is achieving the minimum standards of learning for Education in Emergencies to attain the minimum level of educational access and provision in emergencies.

In order to facilitate students to continue learning and progress to higher grade despite being locked down, initially the "Adapted Curriculum" was embarked as short-term emergency contingency intervention. However, the unabated emergency has inspired to initiate the development of another alternative curriculum in the form of "Prioritized Curriculum". Therefore, in the Second Phase EiE, depending on the unfolding scenario of COVID 19 pandemic, both "Adapted Curriculum" and "Prioritized Curriculum" are implemented in order to facilitate students to cope and progress to higher studies. Its design, development and delivery are informed by the wider educational principles and ideologies of developmental appropriateness, national values, coherence and the generic nature of the spiral curriculum.

This guideline is to inform all stakeholders on the "Prioritized Curriculum" of the Second Phase Education Emergency to facilitate students to continue learning and progress to higher grade with adequate competencies and understanding to cope with the higher learning.

INTRODUCTION

Following the COVID-19 pandemic, continuity of education and learnings has been severely affected as a result of nationwide closure of schools. Given that timely contingency planning is crucial to minimize disruption to our education systems, the Ministry in collaboration with REC, BCSEA and relevant agencies have initiated a number of programmes and activities to roll out Education in Emergency (EiE). This broadly includes the adaptation of school curriculum for EiE, introduction of Google classrooms, use of social media to establish teacher-student-parent linkage for children's learning and engagement, use of print and broadcast media (TV & Radio) for curriculum delivery. This also includes adaptation and modification of school curriculum for children with disabilities, Rigshung students and ECCD children, and NFE learners.

The lessons using the broadcast media has been rolled out across the nation through Bhutan Broadcasting Service (BBS) TV since March 27, 2020. These lessons broadcasted is being continuously reviewed and improved based on observation and feedback from various stakeholders.

EDUCATION IN EMERGENCY CURRICULLUM

Countries around the world adopt different means and forms of making education accessible for all, of which adapted curriculum is commonly used. In our context, depending on the unfolding scenario of COVID 19 pandemic, both "Adapted Curriculum" and "Prioritized Curriculum" are implemented in order to facilitate students to cope and progress to higher studies.

In order to support these children in continuing their education, the Ministry in collaboration with REC has initiated the development and printing of Self Instructional Materials (SIM) from March 25, 2020. As of date, the printing and distribution of first package of SIM print materials for all key stages are completed and distributed to Dzongkhags/Thromdes from April 25, to begin the lessons from May 2, 2020. Additional support particularly for key stage I (PP-class III) will be provided through radio lessons. In the first package, 29 lessons (BBS Radio-19, Kuzoo FM-10) have been recorded, and will be aired on May 02, 2020 as well. Recording for all the SIM packages and the second phase of SIM lesson recording started from April 22, 2020.

Objectives

The two forms of school curricula for Education in Emergency are developed to fulfil the following objectives:

1. Emphasise the learning of the essential concepts fundamental in the development of academic and social competencies.
2. Provide access and avail educational services remotely for students to learn and develop understanding of fundamental concepts and ideas on subjects and competencies to cope with higher learning with mainstream and social media.

3. Engage students productively at home and minimize people-people contact to prevent the spread of virus.
4. Create greater clarity of what teachers should teach and students should learn.
5. Encourage teachers to embrace effective instructional practices by reducing the pressure on covering the vast teaching contents.
6. Ensure the psychosocial wellbeing of students in emergency.

ADAPTED CURRICULUM

In the emergency, it is not feasible to deliver the regular annual curricular contents. The adapted curriculum is based on literacy and numeracy at key stage I and II, and theme-based curriculum for key stage III, IV and V. The most essential learning concepts aligned with the learning outcomes or objectives are selected for all classes. For theme-based curriculum, some learning areas such as Science and Social Sciences have been combined together considering the common themes of the subject. The Adapted Curriculum delivered under various key stages are as under (Table 1):

Table 1. Learning areas in Adapted Curriculum

Key Stage	Class	Learning Areas	Subjects
I	PP-III	Literacy & Numeracy	Dzongkha, English, Mathematics
II	IV-VI	Literacy & Numeracy	Dzongkha, English, Mathematics
III	VII-VIII	Theme Based	Dzongkha, English, Mathematics, General Science, Social Sciences
IV	IX-X	Theme Based	Dzongkha, English, Mathematics, Functional Science, Social Sciences
V	XI-XII	Theme Based	**Compulsory to all:** English, Dzongkha. **Science**: Mathematics, Science- Physics, Chemistry, Biology, Environmental Science, and ICT **Commerce**: Accountancy, Commerce, B. Mathematics **Arts**: History, Geography, Economics, Media Studies, Rigzhung

The theme-based learning areas are detailed in the Adapted Curriculum syllabus.

PRIORITIZED CURRICULUM

In the events of emergency of any form, access to learning is generally facilitated through an adapted curriculum, wherein the regular curriculum is modified with emphasis on development of fundamental concepts and skills in general education, life skills and psycho-social wellbeing. The choice of the curriculum is also guided by the national priority to identify and select the most essential learning concepts and outcomes fundamental for students' continuity of learning and development. In this process, the R.E.A.L Model of prioritization of learning standards (Many,

Tom W. & Horrell, Ted., 2014) or outcomes is widely used around the world. Its intention provides insight in the process of curriculum prioritization in our current emergency setting.

The REAL model consists of the following four key areas:

Readiness: The 'R' stands for Readiness. This standard provides students with essential knowledge and skills necessary for success in the next class, course or grade level.

Endurance: The 'E' represents Endurance. This standard provides students with knowledge and skills that are useful beyond a single test or unit of study.

Assessed: The 'A' represents Assessed. This standard will be assessed on upcoming state and national examinations.

Leverage: The 'L' corresponds to Leverage. This standard will provide students with the knowledge and skills that will be of value in multiple disciplines.

Based on the REAL model, a set of curriculum prioritization criteria was established in selecting the learning contents for our schools in Education in Emergency.

Criteria for Curriculum Prioritization

The Prioritized Curriculum in our context shall be used for all classes PP to XII depending on the evolving situations; if all schools remain closed or if schools open in phases based on the risk level zones, it shall target classes X and XII, while other classes implement adapted curriculum. If all schools open by June, all classes shall use it. The prioritized curriculum for both the scenario is illustrated in Table 2, and the adjusted assessment and examinations shall be administered for promotion.

By drawing lessons from the national priority and the wider world, the Prioritized Curriculum in EiE is informed by the following criteria:

i. Emphasize on fundamental key concepts with limited scope on elaborative areas.
ii. Select common themes through which a few topics or chapters under one or two lessons.
iii. Focus on the development of competencies on the selected themes rather than emphasizing on the academic knowledge and examples.
iv. Create scope for students to take responsibility for their learning by engaging them to explore for specifics and examples of the concepts.
v. Engage students to explore further on the concepts through interactive learning activities.

The focus of the prioritized curriculum is on the development of competencies on the selected themes rather than emphasizing on the academic knowledge and examples. The arrangement of learning topics is informed by the principle of spiral curriculum, progression and coherence of conceptual understanding. However, due to limitation of instructional days for the 2020 academic year, the prioritized curriculum covers about 65% of the regular syllabus of the academic year. It is based on the premise that out of the annual 850 instructional hours, there is a remaining

instructional hours of only 500 hours. This also includes the time needed for psychosocial wellbeing and practice of health procedures essential for students' safety. The prioritized curriculum shall be implemented from June 2020, regardless of schools being reopened or closed.

Considering the limited time available to cover the 2020 academic syllabus, the prioritized curriculum shall emphasize on the development of understanding and competencies of fundamental concepts and ideas in all the subjects in each grade.

Table 2. Prioritized Curriculum

Key stage	Class	Subjects
I	PP - 3	Dzongkha, English, Mathematics, HPE & Values, ICT, Arts Education
II	4 - 6	Dzongkha, English, Mathematics, Science, Social Studies, HPE & Values, ICT, Arts Education
III	7 - 8	Dzongkha, English, Mathematics, General Science, Geography, History, ICT
IV	9-10	Dzongkha, English, Mathematics, Biology, Physics, Chemistry, Environmental Science, Agriculture for Food Security, TVET, Geography, History and Civics, ICT, Economics.
V	11	English, Dzongkha compulsory for all
		Science: Mathematics, Physics, Chemistry, Biology, Environmental Science, and ICT
		Commerce: Accountancy, Commerce, B. Mathematics, TVET, AgFS
		Arts: History, Geography, Economics, Media Studies, *Rigzhung*

DELIVERY OF THE CURRICULUM

The Strategic Plan for Curriculum and Assessment for EiE Phase 2 in Table 3 illustrates the mode of delivery of the Prioritized Curriculum.

Table 3. Strategic Plan for Curriculum and Assessment for EiE

Scenario & Situation			**Curriculum**	**Mode**	**Assessment**
Scenario I	Situation 1	If all schools open at the same time	Class PP – 9 & 11 Prioritized Curriculum	Regular class with safety and precautionary measures	Regular on prioritized curriculum (CFA, Tests, year-end examinations)
			Class 10 & 12 Prioritized Curriculum	Regular class with safety and precautionary measures	
	Situation 2	If schools open in a phased manner	Class PP – 9 & 11 Adapted Curriculum	**Open**: Regular class with safety and precautionary measures **Closed**:	Class PP – 9 & 11: Conventional test / short assignment / Objective type question pattern

				(A) Cl PP-3: BBS, Social media (Wechat / WhatsApp/ Telegram), Radio, SIM (B) Cl 4 -9 & 11: BBS, SIM, Google classroom	
			Class 10 & 12 Prioritized Curriculum	Regular class with safety and precautionary measures	Board Examinations with Safety and preventive measures (25 days) on prioritized curriculum
Scenario II	All schools closed		Class PP – 9 & 11 Adapted Curriculum	A) PP-3: BBS, Social media (Wechat / WhatsApp / Telegram), Radio, SIM (B) Cl 4 -9 & 11: BBS, SIM, Google classroom	Class PP – 9 & 11: Conventional test / short assignment / Objective type question pattern
			Class 10 & 12 Prioritized Curriculum	Regular class in quarantine mode.	Board Examinations with Safety and preventive measures (25 days) on prioritized curriculum
NOTE:	For effective curriculum delivery as well as to provide support for psycho-social wellbeing: • Follow Ministry of Health's protocol and preventive measures. • Follow WASH advisory. • No mid-term examinations. • No trail examinations. • No co-curricular and extra-curricular activities. • Mid-term break to be used as instructional days. • Use Saturdays to adjust instructional days. • Strengthen psychosocial support including help-centres.				

There are students who are dealt with 'pull out' and 'push in' strategies alongside the adaptation and modification in curriculum delivery. Therefore, lessons for Wangsel and Muenseling institutes shall also follow the prioritized curriculum, but delivered by using tools and techniques appropriate for their students. The Takste *Rigzhung* School shall also use tools and techniques appropriate for their students, which may include Google classroom, Youtube, Wechat and other means.

MONITORING & EVALUTIONS

The implementation of curriculum in the Education in Emergency is unprecedented and poses diverse challenges and opportunities as well. Some of the perceived challenges may include the following:

i. Equity and equality to access educational programs for students is immensely affected by geographical location, affordability and connectivity.
ii. Educational background of parents and guidance is making students responsible for their learning.
iii. Professional capacity and integrity of teachers in keeping track of students' learning through remote learning mode may affect students' performance.
iv. The quality and accuracy of lessons influence the quality of students' engagement and the learning.

Therefore, the following mechanism may be implemented in earnest.

i. Provide gadget or alternative means to students who cannot afford and those who are in remote places.
ii. Make provision in making data affordable for students.
iii. Stakeholders like REC, MoE and BCSEA continuously monitor the quality, relevancy and efficacy of resources and activities in EiE, and update accordingly.
iv. Constitute two levels of EiE curriculum delivery and implementation and monitoring:

Central Level – MoE, REC, BCSEA:

a. Design, develop and disseminate the plans and activities on EiE and EiE curriculum in collaboration with relevant stakeholders.
b. Facilitate the accessibility of EiE through the provision of necessary gadget and accessories for students and teachers.
c. Educate teachers and parents on EiE curriculum and its delivery.
d. Encourage parents to participate in their children's learning – guidance and monitoring.

Local Level - *Dzongkhags* & *Thromdhes*:

a. Constitute a small professional forum to oversee and design support mechanism to ensure that all students have access to EiE resources and services.
b. Monitor the professional capacity and integrity of teachers in implementation of EiE curriculum and emergency contingency plans and programs.
c. Identify teacher's needs and provide PD on the specific areas.

d. Periodically share the report on the status of EiE curriculum implementation, success and challenges. Accordingly, relevant stakeholders provide interventions.
e. Take ownership of EiE in their respective *Dzongkhags* and *Thromdhes*.

The information contained in this guidebook is not prescriptive. The Prioritized Curriculum syllabus has been developed collaboratively by stakeholders, Ministry of Education, Royal Education Council, Bhutan Council for School Examinations and Assessment and have evolved out of emergency. The guidebook provides guidance on how Ministry of Education, Royal Education Council, Bhutan Council for School Examinations and Assessment may respond and establish education programmes in emergency settings.

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Education in Emergency

ADAPTED CURRICULUM

KEY STAGE 5: Classes XI – XII

1. DZONGKHA

གནས་རིམ། Key stage	ལྷག་སྦྱོན་འབད་དགོ་པའི་དོན་ཚན་གཅོ་ཅན། Learning area	སྒོ་སྦྱོན་ཐབས་ལམ། Strategy	ལས་རིམ་གྱི་འོས་འབབ། scope
གནས་རིམ་དང་པ། བྷི་གསང་གསུམ་པ་ཚུན།	ཡི་གུའི་སྟོན་སྦྱང་། གསལ་ཆེད་སུམ་ཅུ། དབྱངས་བཞི། མགོ་ཅན་འདོ་གས་ཅན། ཐྱངས་ཀ་1,000 ཚུན་ཞངཡིག་དང་ ཞངཡིག་ཡིག་གཟུགས་ནངཁྱི་ནི། ཉེ་འཚེལ་མིང་ཚིག་འབྲི་ལྷག། སྒྱེར་གློག་ཚིག་སྤྲད། དང་དང་ཚངེས་གས་ བཟའ་ཚངདང་སྒོ་བ་གྱ གཡུས་དང་ མཐའ་འགོར་ཚུ་གི་སྐོར་ལས་ བཤད་པ་ཐྱངཀུ་དེ་རྒྱབ་ནི། དཔེ་དེབ་ལྷག་ཐངས།	རྒྱང་བསྒྲགས་ཐོག་ལས་ སྒོ་བ་སྦྱོན་འབད་ནི། ཞམ་ཤེས་ཡོན་ཡོད་མི་ཚུ་ལུ་ ཁྱིམ་ནང་ལྷག་ནི་དེ་ མཁོ་ཆས་བཙོ་ཡོད་མི་ཚུ་བཀྲམ་ནི་དང་། སྦྱོན་ཚན་དང་འཁྱིལ་བའི་ སྒོ་བསྒྱོང་ལས་དོན་ཚུ་བཀྲམ་སྟེ་ རང་སོའི་ཞ་ལོ་ཚུ་ལུ་ རྒྱབ་སྐྱོར་འབད་བཅུག་ནི། སྒོ་བ་དཔོན་ཚུ་གིས་ ཡོངས་འཛིལ་ཐོག་ལས་ ཁྱིམ་ལུ་རེ་བྱིན་ཏེ་ རིག་ཐོག་དང་ངག་ཐོག་དབྱེ་ཞིབ་འབད་ནི། སྒོ་གླུའི་ མཐོང་ཐོས་མཁོ་ཆས་ཚུ་ཞབ་ལེན་འབད་དེ་ ཉན་ཐོག་ལས་ ཉེ་འཚེལ་མིང་ཚིག་ལྷབ་བཅུག་ནི། WeChat, Facebook YouTube, google ཚུ་གི་ཐོག་ལུ་ ཡི་གུའི་བཀལ་ཐངས། རྩོད་སྤྲ་ལ་སོགས་པའི་ མཐོང་ཐོས་ མཁོ་ཆས་ ཐྱངཀུ་དེ་བཙོ་སྟེ་བཀམ་ནི། ལྷག་དེབ་ལྷག་ཐངས་ཀྱི་དཔེ་སྟོན་མཐོང་ཐོས་ཐོག་ལས་བཙོ་སྟེ་ བཀམ་ནི། ཁྱིམ་ནང་ ཡིག་བཙོའི་སྒྱོང་དེབ་ཀ་ལས་ང་ཚུན་ཡོད་མི་ཚུ་ ལག་ལེན་འཐབ་སྟེ་ ཡིག་བཙོ་ལྷབ་བཅུག་ནི། dzongkha for kidsགི་མཐོང་ཐོས་མཁོ་ཆས་ཚུ་ ཞབ་ལེན་འབད་དེ་ལྷབ་བཅུག་ནི།	དབྱངས་གསལ་གྱི་ ཡིག་བཙོའི་ བཀལ་ཐངས་དང་ རྩོད་སྤྲའི་སྒོ་བ་སྟོན། ཞབཡིག་དང་ ཡིག་གཟུགས་ཀྱི་ བཀལ་ཐངས་དང་ རྩོད་སྤྲའི་སྒོ་བ་སྟོན། མིང་གཞི་ལུ་ སྟོན་རྩེས་ཀྱི་འཛུག་ཚུལ་གྱི་ སྒོ་བ་སྟོན། ཉེ་འཚེལ་མིང་ཚིག་ལྷབ་སྤྱང་གི་སྒོ་བ་སྟོན། ལྷག་དེབ་ལྷག་ཐངས་ཚུ་ཞབ་ལེན་ འབད་ནི་ སྒོ་བ་ སྟོན་ཚུ་ འབད་དགོས་འདུག

གནས་རིམ།	ལྷག་སྟོན་འབད་དགོ་པའི་དོན་ཚན་གཅོ་ཅན།	སློབ་སྟོན་ཐབས་ལམ།	ལས་རིམ་གྱི་འོས་འབབ་
གནས་རིམ་གཉིས་པ། བཞི་པ་ལས་དྲུག་པ།	**འཕྲི་རྩོམ**་ལས་ འགེལ་བཤད་དང་ ལོ་རྒྱུས་འཕྲི་རྩོམ་ཚུ་གཞི་བཞག་ཐོག་ལས་ འཕྲི་ལྷག་ཉན་སྒྲུབ་ཀྱི་སྤྱད་བ།	རྒྱང་བསྒྲགས་ནང་ལས་སློབ་སྟོན། ཨམ་ལུ་ ཞ་ལོའི་ རྒྱབ་སྐྱོར་གྱི་ལམ་སྟོན་ཐེབ་ནི། སློབ་སྤྱོང་ལས་དོན་ ཨམ་ཚུ་ལུ་བཀྲམ་ནི། ཞིམ་ནང་ལྷག་ནི་འམ་ཆས་ངོས་འཛིན་འབད་དེ་ ལྷག་བཅུག་ནི། སློབ་དཔོན་ཚུ་གིས་ ཡོངས་འཛོལ་ཐོག་ལས་ ཞིམ་ལུ་རེ་ཐེབ་ནི། དེ་བའི་ལན་འཐོབ་ཐབས་ལུ་ ལྷག་དེབ་ལྷག་བཅུག་ནི། ཡིག་བཟོའི་སྤྱོད་བ། WeChat, Facebook, YouTube, google ཚུ་གི་ཐོག་ལུ་ མཐོང་ཐོས་མཁོ་ཆས་ཚུ་བཟོ་སྟེ་བཀྲམ་ནི། དཔེར་ན། འཕྲི་རྩོམ་འཕྲི་ཐངས། སྐད་འཕྲི་ཐངས་དང་ལྷག་ཐངས། ཞུ་ཡིག་འཕྲི་ཐངས། ཡི་གུའི་སྤྱོད་བ་ཤེས་ཐབས་ཀྱི་ མཐོང་ཐོས་མཁོ་ཆས་ཚུ་ བཟོ་སྟེ་བཀྲམ་ཐོག་ལས་ ལྷག་བཅུག་ནི་བཟུམ། ཡོངས་འཛོལ་ཐོག་ལས་ དཀའ་ཐོག་དང་ཡིག་ཐོག་གི་འདྲི་ལན་འབད་དེ་ དབྱེ་ཞིབ་འབད་ནི།	རྩོམ་རིག་མ་འདྲཝ་གསུམ་གྱི་སྐོར་ལས་ དོ་སྤྲོད་དང་ཞུན་རྟམ་དཔེ་ཚུ་གི་སྐོར་སློབ་སྟོན་འབད་ནི། ཡིག་སྤྱོང་གྱི་དོན་ཚན་ཚུ་གི་སྐོར་ལས་ གོ་དོན་གསལ་བཤད་ཀྱི་སློབ་སྟོན། ཡིག་འགྲུལ་གྱི་དོན་ཚན་གཉིས་ཀྱི་སྐོར་ལས་ འཕྲི་ཐངས་ཀྱི་ སློབ་སྟོན་ཚུ་ འབད་དགོ་ནི་ཨིན་མས།
	ལྷན་རྩོམ་ནང་ལས་ ཞབས་ཏོ་གཞི་བཞག་གི་ འཕྲི་ལྷག་ཉན་སློབ་ཀྱི་སྤྱད་བ།		
	སྤྱད་དཔག་ཆ་རྩོད་ལས་ དངོས་སྤྱད་དང་ འཚར་སྤྱད་གཞི་བཞག་གི་ འཕྲི་ལྷག་ཉན་སློབ་ཀྱི་སྤྱད་བ།		
	ཡིག་སྤྱོད་ལས་ ལོག་ཡིག་མཐུག་ཡིག། ཚག་ཤད། མིང་ཚབ། ལ་དོན་གྱི་ཐུད། མིང་ཚབ། མིང་གི་ཁྱད་ཆོག།འབྲུང་ཁུངས། མིང་མཐའ། ཐུ་ཚིག་གི་ཚིག་གོགས། འཛེལ་སྒྲ། སྒྲུབ་ཚིག། དགག་ཚིག། ཐུ་བའི་ཁྱད་ཆོག། ཚིག་མཚམས། བརྗོད་མཚམས། དོན་མཚམས་གཅད་ཐངས་ཚུ་གི་ལྷབ་སྤྱད་འབད་དེ་ བྱ་ནའི་རིག་རྩལ་ལྷབ་བཅུག་ནི།		
	ཡིག་འགྲུལ་ལས་ ཞུ་ཡིག་དང་ གཏང་ཡིག་གཞི་བཞག་གི་འབྲི་ལྷག་སྤྱད་བ།		

གནས་རིམ།	ལྷག་སྟོན་འབད་དགོ་པའི་དོན་ཚན་གཅོ་ཅན།	སློབ་སྟོན་ཐབས་ལམ།	ལས་རིམ་འོས་འབབ།
གནས་རིམ་གསུམ་པ། བདུན་པ་ལས་བརྒྱད་པ།	**འཕྲི་རྩོམ**་ནང་ལས་ འགེལ་བཤད། ལེ་རྒྱས། རྒྱང་སྐུལ། འཆར་སྒང་འཕྲི་རྩོམ་ཚུ་གི་ཐོག་ལས འཕྲི་ལྷག་ཉན་སློབ་ཀྱི་སྤྱང་བ།	རྒྱང་བསྒྲགས་སློབ་སྟོན། ཨམ་ལུ་ ཨ་ལོའི་ རྒྱབ་སྐྱོར་གྱི་ལམ་སྟོན་ཐིན་ནི། སློབ་སྦྱོང་ལས་དོན་ ཨམ་ཚུ་ལུ་བཀྲམ་ནི། ཁྱེམ་ནང་ལྷག་ནིའི་ མགོ་ཆས་ངོས་འཛིན་འབད་དེ་ལྷག་བཙུག་ནི། སློབ་དོལ་ཚུ་གིས་ ཡོངས་འབྲེལ་ཐོག་ལས་ ཁྱེམ་ལུ་རེ་ཐིན་ནི། དྲི་བའི་ལན་འཐོབ་ཐབས་ལུ་ ལྷག་དེབ་ལྷག་བཙུག་ནི། ཡིག་འབྲེའི་སྦྱོང་བ། WeChat, Facebook, YouTube ཚུ་གི་ཐོག་ལུ་ མཐོང་ཐོས་མགོ་ཆས་ཚུ་ བཟོ་སྟེ་བཀྲམ་ནི། དཔེར་ན། འཕྲི་རྩོམ་འཕྲི་ཐབས། སྤྱང་འཕྲི་ཐབས་དང་ལྷག་ཐབས། ཞུ་ཡིག་འཕྲི་ཐབས། ཡི་གུའི་སྦྱོང་བ་ཤེས་ཐབས་ཀྱི་ མཐོང་ཐོས་མགོ་ཆས་ཚུ་ བཟོ་སྟེ་བཀྲམ་ཐོག་ལས་ ལྷག་བཙུག་ནི་བཟུམ། ཡོངས་འབྲེལ་ཐོག་ལས་ དག་ཐོག་དང་ཡིག་ཐོག་གི་འདྲི་ལན་འབད་དེ་ དབྱེ་ཞིབ་འབད་ནི།	རྩོམ་རིག་མ་འདྲཝ་གསུམ་གྱི་སྐོར་ལས་ དོ་སྣོད་དང་ཁྲད་རྟགས་དཔེ་ཚུ་གི་མཐོང་ཐོས་མགོ་ཆས་བཟོ་སྟེ་སྟོན་ནི། ཡིག་སྦྱོང་གྱི་དོན་ཚན་ཚུ་གི་སྐོར་ལས་ གོ་དོན་གསལ་བཤད་ཀྱི་སྒོབ་སྟོན། ཡིག་འབྲུལ་གྱི་དོན་ཚན་གཉིས་ཀྱི་སྐོར་ལས་ འཕྲི་ཐངས་ཀྱི་སྒོབ་སྟོན་ཚུ་འབད་དགོ་ནི་ཞིན་མས།
	ཡིག་སྦྱོང་དོན་ཚན་ཚུ་ལས་ སྟོན་རྩེས་ཡང་འཛུགས་གི་ངོས་འཛིན་དང་ བཏ་བཤད་ཀྱི་རིགས། ཚིག་མཚམས། བརྗོད་མཚམས། དོན་མཚམས། འཛེལ་སྒྲ། མིང་གི་ཁྱད་ཚིག། དང་སྒྲ། དུ་སྒྲ། ཅེད་སྒྲ། ལྷག་བཅས། འཛེལ་ཚིག། མིང་དང་བྱ་ཚིག་ལུ་ཞེ་ས་སྤྱང་བ། བྱ་ཚིག་དུས་གསུམ་ཡིག་སྟེབ། བརྗོད་པའི་དབྱེ་བ། དེ་སྒྲ་ནེ་སྒྲ། ཆུན་སྤྲུ། བསྡུ་ཡིག། སྤྱི་སྒྲ། གང་ཟག་དང་པ་དང་གཉིས་པའི་ངོས་འཛིན། མིང་ཚིག་ བརྗོད་པའི་རྣམ་གཞག་གི་དོན་ཚན་ཚུ་ གཞི་བཞག་ཐོག་ལས་ བྱེ་ནིའི་སྤྱང་བ།		
	ཡིག་འབྲུལ་དོན་ཚན་ཚུ་ལས་ ཞུ་ཡིག་དང་ གཏང་ཡིག་བྱེ་ནིའི་སྤྱང་བ།		

གནས་རིམ།	ལྷག་སྟོན་འབད་དགོ་པའི་དོན་ཚན་གཅོ་ཅན།	སློབ་སྟོན་ཐབས་ལམ།	ལས་རིམ་འོས་འབབ།
གནས་རིམ་བཞི་པ། དགུ་པ་དང་བཅུ་པ།	**འཕྲི་རྩོམ**་ཚུ་ལས་ འགེལ་བཤད་དང་ ལེ་རྒྱུས། རྒྱུད་སྐུལ། འཆར་སྒང་འཕྲི་རྩོམ་ཚུ་གི་ཐོག་ལས་ འཕྲི་ལྷག་ཉན་སློབ་ཀྱི་སྤྱང་བ།	རྒྱང་བསྒྲགས་སློབ་སྟོན། ཤེས་ཡོན་ཅན་གྱི་ཐམ་ཚུ་ལུ་ སྟོན་ཚན་དང་འཁྲིལ་བའི་ སློབ་སྦྱོང་ལས་དོན་ཚུ་ ཐམ་ཚུ་ལུ་བཤད་ཐེབ་ཀྱ་ རྒྱབ་སྐྱོར་འབད་བཅུག་ནི། སློབ་དཔོན་ཚུ་གིས་ ཡོངས་འཛོལ་ཐོག་ལས་ ཁྱིམ་ལྟ་རེ་བྱེད་ནི། རྒྱལ་སྡས་ལཱག་ལེན་གྱི་ སློབ་སྟོན་ མཐོང་ཐོས་མཁོ་ཆས་བཟོ་སྟེ་ སྟོན་ནི། རྒྱབ་རྟེན་དཔེ་དེབ་ གང་མང་ ཡོངས་འཛོལ་ཐོག་ལས་ འཐོབ་ཚུགསཔ་བཟོ་ནི། ཁྱིམ་ནང་ལྷག་ནི་དེ་ དོན་ཚན་མཁོ་ཆས་ངོས་འཛིན་འབད་དེ་ ལྷག་བཅུག་ནི། དྲི་བ་བཀོད་དེ་ དེའི་ལན་འཐོབ་ཐབས་ལུ་ ལྷག་དེབ་ལྷག་ བཅུག་ནི། ཡིག་བཟོའི་སྦྱོང་བ། WeChat, Facebook, YouTube ཚུ་གི་ཐོག་ལུ་ མཐོང་ཐོས་མཁོ་ཆས་ཚུ་བཟོ་ སྟེ་བཀྲམ་ནི། དཔེར་ན། འཕྲི་རྩོམ་འཕྲི་ཐངས། སྐད་འཕྲི་ཐངས་དང་ལྷག་ ཐངས། ཞུ་ཡིག་འཕྲི་ཐངས། ཡི་གུའི་སྦྱོང་བ་ཤེས་ཐབས་ཀྱི་	རྩོམ་རིག་མ་འདྲཝ་གསུམ་གྱི་སྐོར་ལས་ དོ་སྣོད་དང་ཁྲད་རྟགས་དཔེ་ཚུ་གི་སྐོར་སྣོད་ སྟོན་འབད་ནི། ཡིག་སྦྱོང་གྱི་དོན་ཚན་ཚུ་གི་སྐོར་ལས་ གོ་དོན་གསལ་བཤད་ཀྱི་སྣོད་སྟོན། ཡིག་འགྱུལ་གྱི་དོན་ཚན་གཅེས་ཀྱི་སྐོར་ ལས་ འཕྲི་ཐངས་ཀྱི་སྣོད་སྟོན་ཚུ་འབད་ དགོ་ནི་ཞིན་མས།

	ཡིག་འགྲུལ་ཚུ་ལས་ ཞུ་ཡིག། གཏང་ཡིག། བཀའ་རྒྱ། ཁྲན་བསྒྲགས། སྐན་ཞུ། སྐན་གསོལ། ཟིན་བྱིས། ལས་རིམ། ཐོས་གཞི། ཐོས་ཆོད། ཞུ་ཡིག། བཤེར་ཡིག། ངག་བརྡོད། འབའ་གན་རྒྱ་ཚུ། གཞི་བཞག་ཐོག་ལས། འབྲི་ཡྱག་ཉན་སྒྲབ་ཀྱི་སྤྱང་བ།	མཐོང་ཐོས་མཁོ་ཆས་ཚུ་ བཟོ་སྟེ་བཏགམ་ཐོག་ལས་ ཡྱབ་བཅུག་ནི་བཟུམ། ཡོངས་འབྲེལ་ཐོག་ལས་ ངག་ཐོག་དང་ཡིག་ཐོག་གི་འདྲི་ལན་ འབད་དེ་ དབྱེ་ཞིབ་འབད་ནི།	
གནས་རིམ།	**ཡྱབ་སྟོན་འབད་དགོ་པའི་དོན་ཚན་གཅོ་ཅན།**	**སློབ་སྟོན་ཐབས་ལམ།**	**འོས་འབབ།**
གནས་རིམ་སྤྱི་པ། **།།་པ་དང་།།་པ།**	**འབྲི་རྩོམ**་ཚུ་ལས་ རྩོད་གླེང་དང་ རྒྱས་བཤད་ འབྲི་རྩོམ་གཞི་བཞག་གི་ འབྲི་ཡྱག་ཉན་སྒྲབ་ཀྱི་སྤྱང་བ།	**རྒྱང་བསྒྲགས་སློབ་སྟོན།** རྒྱལ་སྤས་ལག་ལེན་གྱི་ སློབ་སྟོན་ མཐོང་ཐོས་མཁོ་ཆས་བཟོ་སྟེ་སྟོན་ནི།	རྩོམ་རིག་མ་འདྲཔ་གསུམ་གྱི་སྐོར་ལས་ དོ་སྤྲོད་དང་ཞུན་རྣམ་དཔེ་ཚུ་གི་སྐོར་སློབ་སྟོན།
	སྐན་རྩོམ་ཚུ་ལས་ ཞབས་ཞུ་ བློ་ཟེ། རྩང་མོ། དཔྱེ་གཏམ། ཁ་བཤད། གསལ་བཤད་ལ་སོགས་པའི་ རྩོམ་རིག་གཞི་བཞག་ཐོག་ལས་ འབྲི་ཡྱག་ཉན་སྒྲབ་ཀྱི་སྤྱང་བ།	ཁྱེན་ནང་ཡྱག་ནི་ཡི། དོན་ཚན་མཁོ་ཆས་ངོས་འཛིན་འབད་དེ་ ཡྱག་བཅུག་ནི།	ཡིག་སྤྱོང་གྱི་དོན་ཚན་ཚུ་གི་སྐོར་ལས་ གོ་དོན་གསལ་བཤད་ཀྱི་སློབ་སྟོན།
	སྤྱད། དངོས་སྤྱད་ འཆར་སྤྱད་གཞི་བཞག་ཐོག་ལས་ འབྲི་ཡྱག་ཉན་སྒྲབ་ཀྱི་སྤྱང་བ།	རྒྱབ་རྟེན་དུས་དེབ་ གང་མང་ ཡོངས་འབྲེལ་ཐོག་ལས་ འཐོབ་ཚུགསམ་བཟོ་ནི། སློབ་དོན་ཚུ་གིས་ ཡོངས་འབྲེལ་ཐོག་ལས་ ཁྱེན་ལྟ་རེ་བྱེན་ནི།	ཡིག་འགྲུལ་གྱི་ དོན་ཚན་གཅེས་ཀྱི་སྐོར་ལས་ འབྲི་ཐངས་ཀྱི་ སློབ་སྟོན་ཚུ་ འབད་དགོ་ནི་ཨེན་མས།
	བཤེས་སྤྲིངས་ཐོག་ལས་ ནང་པའི་ཆོས་ཀྱི་བརྩི་མཐོང་དང་ ཆོས་སྐད་ཀྱི་མིང་ཚིག་ཡིག་སྟེབ་ཡྱབ་སྤྱང་འབད་ནི།	དྲི་བ་བཀོད་དེ་ དེའི་ལན་འཐོབ་ཐབས་ལུ་ ཡྱག་དེབ་ཡྱག་བཅུག་ནི།	
	ཡིག་སྤྱོང་གྱི་དོན་ཚན་ཚུ་ལས་ བྱ་ཆོག་དུས་གསུམ་གྱི་ཡིག་སྟེབ། ཆམ་དབྱེ་བརྩུད་ཀྱི་དབྱེ་བ། སྐད་ཡིག་གི་འབྱུང་ཁུངས། སྤྱར་བསྡུ། ཆོས་སྐད་དང་རྩོད་ཁའི་རྩོད་སྤྱ་དང་ཡིག་སྟེབ་ཁྲབ་པར། རྩོད་སྤྱ་ཕྱོགས་མཚུངས་ཡིག་སྟེབ་ཁྲབ་པར། བདག་གཞན་དུས་གསུམ། བྱ་བྱེད་ལས་གསུམ། ཡི་གུ་ཚོ་མོའི་དབྱེ་	ཡིག་བཟོའི་སྤྱོང་བ། WeChat, Facebook, YouTube ཚུ་གི་ཐོག་ལུ་ མཐོང་ཐོས་མཁོ་ཆས་ཚུ་བཟོ་སྟེ་ བཏགམ་ནི། དཔེར་ན། འབྲི་རྩོམ་འབྲི་ཐངས། སྐུང་འབྲི་ཐངས་ དང་ཡྱག་ཐངས། ཞུ་ཡིག་འབྲི་ཐངས།	

	བཤད། སྐད་ཡིག་གི་ཁྱད་རྣམ་དང་སྒྲུབ་ཚུལ། མཚུངས་གསལ། ཐེ་ཚོམ། མིང་ཚིག་བརྗོད་པའི་རྣམ་གཞག། ཚོས་སྐད་དང་རྗོངཁའི་ཕྱད་རྣམ་དབྱེ་ཚུ་གི་ཐོག་ལས་ བྱེ་ནིའི་རིག་རྩལ་འཐོབ་ཐབས་ཀྱི་སྒྲུང་བ།	ཤེས་ཡོན་ཅན་གྱི་ ཚམ་ཚུ་ལུ་ སྟོན་ཚན་དང་འཁྲིལ་བའི་སློབ་སྒྲོང་ལས་དོན་ཚུ་ ཚམ་ཚུ་ལུ་བཤད་ཁྱེན་ཏེ་ རྒྱབ་སྐྱོར་འབད་བཅུག་ནི།	
	ཡིག་འབྲུལ་གྱི་དོན་ཚན་ཚུ་ལས་ ཞུ་ཡིག། གཏང་ཡིག། འཕྲིན་ཡིག། སྐྱན་ཞུ། སྐྱན་གསོལ། གྲོས་གཞི། གྲོས་ཚོད། ཞུ་ཡིག། བཤེར་ཡིག། དགེ་བརྗོད། འབའ་གན་རྒྱ་ཚུ་ བྱེ་ནིའི་སྒྲུང་བ།	ཡོངས་འཛིལ་ཐོག་ལས་ དགེ་ཐོག་དང་ཡིག་ཐོག་གི་འདྲི་ལན་ འབད་དེ་ དཔྱེ་ཁེབ་འབད་ནི།	
ལྷབ་སྒྲུབ་འབད་ཐབས་དང་ དཔྱེ་ཁེབ་ཐབས་ལམ།	བློ་གསར་ལས་ ༡༡པ་ཚུན་གྱི་སློབ་ཕྲུག་ཚུ་གིས་ རྗོང་ཁའི་ཁྱེད་རང་ གྲུབ་མཐོང་དང་ ཡོངས་འཛིལ་ འགྲུལ་འཕྲིན་ བཀོད་ཅིག་ཁོངས་ཚུ་གི་ཐོག་ལས་ དང་ རང་གིས་འབད་ སྤྱི་བ་བསྒྲིད་དེ་ལྷབ་དགོཔ་དང། རང་གི་ཕམ་དང་སྤྱན་ཆ་ཚུ་ལས་ གྲུབ་སྐྱོར་ལེན་ཏེ་ ལྷབ་དགོཔ་ཨིན། དེ་སྦེ་ལྷབ་སྒྲུང་འབད་ཚར་བའི་ཤུལ་ལུ་ དཔྱེ་ཁེབ་འབད་ཐབས་དེ་ཡང་ རང་ཉིད་དཔྱེ་ཁེབ་དང། ནང་རྟོག་དཔྱེ་ཁེབ་ཀྱི་ཐབས་ལམ་ཚུ་ སྟོན་ཏེ་ ཤེས་མ་ཤེས་དཔྱེ་ཁེབ་འབད་ནིའི་ ཐབས་ཤེས་ཚུ་སྟོན་ནི་དང། མཐའ་མཇུག་གི་ཚོས་རྒྱུགས་དེ་ཡང་ ལས་འགུལ་དང་ འདྲི་ལན་ ཡང་ ཡོངས་འཛིལ་google ཚུ་གི་ཐོག་ལས་ དུས་ཐོག་ལུ་ ཚོས་རྒྱུགས་ལེན་ནིའི་ ཐབས་ལམ་མ་འདྲཝ་ཚུ་གི་ཐོག་ལས་ དཔྱེ་ཁེབ་འབད་ནི་ཨིན།	

2. ENGLISH

Key Stages	Learning Areas	Strategies	Remarks/Scope
Key Stage I (PP- III)	Literacy Skills – Phonemic awareness - Alphabet sounds - Blending and segmenting	**Use SSP package** supplied during CFA Workshop to adapt, develop materials teach sounds. These can also be shared on social media platforms like WeChat	Phonemic awareness is the foundational literacy skill.
	Read Aloud	Conduct Read-Aloud sessions using the Readers. Video tape of Read-Alouds using the Readers for respective classes and share	Build vocabulary and develop reading skill.
	-Writing	-Use the Workbooks to develop assignments on writing. Example – 1) Picture matching 2) Picture to word matching. 3) Fill in the blanks 4) Sentence completion, 5) Simple picture description.	These activities can also be used as extended activities or follow-up on the Read-aloud sessions.
	Letter formation, esp. for PP.	Share letter formation guide and share with the parents (Use SSP package for practice and progression – start with s,a,t,p,i,n)	Parents should let children practice and share the children's work with the teachers.
	Personal letter writing (class III)	Explain, with a demo, the format and features of a personal letter – ask students to practice.	Parents should guide
Key stage II (IV – VI)	Writing -Book reviews -Summaries -Folk-tales	Identify appropriate topics from the text and ask students to read and carry out writing tasks.	
	Creative writing (realistic fiction)	Give as many topics as possible and ask children to choose and write on one topic every fortnight. Teachers should share the features of realistic fiction.	Encourage children to first share paragraphs, instead of the whole written work. This way, it will be easier to monitor and guide. Wherever possible, parents should help children.

	Reading	Select the most appropriate texts (Short stories, essays and poems) Explain the features of the respective genres and demonstrate the skills needed to comprehend the different texts. Ask students to read a certain number of stories, essays and poems from the textbook periodically .Teachers develop appropriate set of prompts/cues to check the understanding.	Let children video/audio-tape their readings of stories, essays and poems and share with the teacher and friends for comments and feedback.
	Listening and Speaking	Share the Resources (Audio/video) on Listening provided by REC and design questions to build/assess listening skills.	
Key stage III (VII – VIII)	Writing -reports -summaries -fantasy -narrative essay	Explain the features of each genre of writing. Compile and share as many topics as possible on each genre. Ask students to use the features of the respective genre and write. They should submit at least one complete written work every month for comments and feedback	Focus on narrative writing. In the beginning ask children to submit paragraphs instead of the whole essay. This way, it will be easier for the teacher to monitor and guide.
	Reading	Select the most appropriate texts (Short stories, essays and poems) Explain the features of the respective genres and demonstrate the skills needed to comprehend the different texts. Ask students to read a certain number of stories, essays and poems from the textbook periodically .Teachers develop appropriate set of prompts/cues to check the understanding. Teachers should adjust their prompts and questions according to the level of understanding. Students should also keep a record of other books and texts they read in the form of reviews.	The 'certain' number of texts to be read is to be decided by individual teachers depending on to the extent that students are able to achieve the objectives stated in the Reading & Literature strand.
	Grammar	-Refer the objectives and develop lessons accordingly.	Develop exercise and activities for the students to complete and submit for feedback
		Use the audio-visual grammar lesson provided by REC, or other available resources and assign practice questions.	

	Listening and Speaking	Use the listening & speaking resources package provided by REC and design questions or activities for students to listen to the audio/video.	Design and share a set of questions to check the listening skill. Alternately, appropriate and relevant audios can be downloaded from YouTube.
Key Stage IV (IX – X)	Reading & Literature	Select the most appropriate texts (Short stories, essays and poems) Explain the features of the respective genres and demonstrate the skills needed to comprehend the different texts. Ask students to read a certain number of stories, essays and poems from the textbook periodically .Teachers develop appropriate set of prompts/cues to check the understanding. Teachers should adjust their prompts and questions according to the level of understanding. Ask students to maintain a record of the books/texts read in the form of reviews(Reading portfolio). This is to be used for awarding CA.	Refer the objectives and focus on the genre stated therein. -Use the records to award CA.
		Design a schedule/timetable to assign students to read a certain portion of the novel. Create a platform where students can share their understanding, doubts and critiques on the novel. The teacher should clarify wherever needed.	
	Writing -Descriptive -Expository	Refer the resource package provided by REC and share essay writing guides and sample essays	
		Share the features of each genre of writing. Compile and share as many topics as possible on each genre. Ask students to use the features of the respective genre and write. They should submit at least one complete written work every month for comments and feedback. (Writing Portfolio)	In the beginning ask students to submit just the introductory paragraph so that teachers can guide and comment on the thesis statement. Use the best written work of individual students for awarding the CA mark
	Language and Grammar	Download relevant grammar lessons as per the objectives and share with students.	

		Design grammar activities and questions for students to carry out and complete periodically	
	Listening and Speaking	Use the listening & speaking resources package provided by REC and design questions or activities for students to listen to the audio/video. Design and share a set of questions to check the listening skill. Alternately, appropriate and relevant audios can be downloaded from YouTube.	
		Ask students to audio/video tape their speeches and submit.	Use these to assess their speaking, and award CA accordingly.
		-Ask students to prepare speeches and record their deliver. Let them share their speeches with others and the teacher for feedback and comments.	
Key stage V (XI-XII)	Reading & Literature.	Select the most appropriate texts (Short stories, essays and poems) Explain the features of the respective genres and demonstrate the skills needed to comprehend the different texts. Ask students to read a certain number of stories, essays and poems from the textbook periodically .Teachers develop appropriate set of prompts/cues to check the understanding. Teachers should adjust their prompts and questions according to the level of understanding.	Refer the objectives and focus on the genres stated therein.
		Use the resources on *The Merchant of Venice* provided by the REC during the orientation workshop to develop lessons. Ask students to answer the questions given in the package. -Prepare a schedule for students to read a certain portion weekly/fortnightly. - Create a platform where students can share their understanding, doubts and critiques on the novel. The teacher should clarify wherever needed.	The teacher may design additional questions on the Merchant of Venice and other texts. -Ask students to video/audio tape their renderings of famous dialogues and share with the teacher and friends.
	Writing -reports -summaries -Stories	Refer the resource package provided by REC and share essay writing guides and sample essays	
		Explain the features of each genre of writing.	In the beginning ask students to submit just the introductory

	-Persuasive essay -Argumentative essay.	Compile and share as many topics as possible on each genre. Ask students to use the features of the respective genre and write. They should submit at least one complete written work every month for comments and feedback	paragraph of their essay. They should develop their writing further only after getting the 'go-ahead' from the teacher.
	Listening and Speaking	Use the listening & speaking resources package provided by REC and design questions or activities for students to listen to the audio/video. Design and share a set of questions to check the listening skill. Alternately, appropriate and relevant audios can be downloaded from YouTube.	
		Ask students to prepare speeches and record their deliver. Let them share their speeches with others and the teacher for feedback and comments.	
	Language and grammar	-Select appropriate grammar exercises and activities from the book periodically and ask students to complete them and submit for correction and feedback.	
		Video-tape teaching crucial topics and share.	
		Download relevant grammar lessons and share with students.	

3. MATHEMATICS

Key Stage	Theme/Topic	Pedagogy/Strategy/Tools	Remarks/Scope
I (PP-III)	Numbers and Operations	BBS1 & BBS2	• Representing Numbers • Counting and identifying set to five and numeral writing from 1-1000 • Use place value chart • Meaning of subtraction and addition • Division as repeated subtraction • Adding and Subtracting 2-digit numbers using various ways • Using varieties of strategies to add • Calculating change
	Sorting and Patterns	BBS1 & BBS2	• Describing object • Describing repeating number pattern • Creating pattern • Apply patterns to problem based on number, geometry and measurement.
	Measurement	BBS1 & BBS2	• Measuring and Comparing with non-standard and standard units • Introducing and measuring length, volume, and capacity • Days, weeks, months and seasons
	Geometry	BBS1 & BBS2	• Identifying, describing and comparing 3-D shape • Identifying, describing and comparing 2-D shape • Name and explore geometric shapes according to attributes • Polygon, combining polygon
	Data Management and Probability	BBS1 & BBS2	• Collecting and organizing data • Interpreting and Creating bar graph with scale • Using probability language
Key Stage II (IV-VI)	Numbers and Operations	BBS1 & BBS2	• Place Value: whole numbers to 5 and 7 digits • Compare & Order Whole Numbers to 5-digits • Mixed Numbers: modeling, use division meaning to change an improper fraction to a mixed number • Renaming: simple fractions to decimals • Ratio: part to part, part to whole • Integers: negative and positive • Addition & Subtraction: decimals and wholes choosing most appropriate method (pencil, mental, calculator, estimation • Multiplication & Division: decimals and wholes choosing most appropriate method (pencil, mental, calculator, estimation) and as well using various strategies.

			• Multiplication Properties and Facts • Addition & Subtraction: simple fractions with common denominators • Addition & Subtraction: simple fractions - various denominators **Assessment:** Assign through Google Classroom Solve question assigned and submit response
	Sorting and patterning	BBS1 & BBS2	• Open Sentences: patterns in addition, subtraction, multiplication & division • Computation patterns □, ÷: how a change in either factor affects the computation • Whole Numbers & Decimals: relationship in computation • Equivalent Fractions: multiplicative relationship • Equivalent Ratios: change in one term affects the other term • Area/Perimeter: changing rectangle dimensions • SI Measurement: pattern in changing units • Volume Patterns: explore
	Measurement	BBS1 & BBS2	• Estimate and measure in mm, cm, dm, m, km • Volume: estimate & measure • Volume & Capacity: solve simple problems • Volume & Capacity: relationships • Area: estimate & measure (square cm - symbols) • Constant Area - Different Perimeters • Area: irregular shapes - estimate & measure • Area (of a Triangle): relate to area of a parallelogram • Perimeter: polygons • Perimeter & Area: rectangles & squares • Angles: (meaning) amount of turn • Angles: estimate, measure and draw
	Geometry	BBS1 & BBS2	• Orthographic Drawings: make and interpret shapes • Quadrilaterals: sort by properties & make generalizations (concretely) • Cross Sections: 3-D shapes (cones, cylinders, prisms, pyramids) • Quadrilaterals: sort by attributes • Prisms, Pyramids, Cones, Cylinders • Nets: draw for rectangular prisms & cubes • Slides, Flips, turns (half, quarter): predict & confirm results for 2-D shape • Translations & Reflections: generalize & apply • Rotations: 1/4, 1/2, 3/4 turns: predict & investigate • Reflective Symmetry: generalize for properties of various quadrilaterals • Rotational Symmetry properties: squares & rectangles • Planes of Symmetry: 3-D shapes

			• Perpendicular lines / segments • Bisectors: of angle, segments • Congruence: polygons • Similarity: name, describe & represent **Assessment**: Assign through Google Classroom. Solve question assigned and submit response.
	Data Management and Probability	BBS1 & BBS2	• Collect, Organize & Describe Data: real world issues • Evaluate Data: choose appropriate samples • Bar & Double Bar Graphs: construct and interpret • Mean, Median, Mode: concepts • Simple Outcomes: more / less likely • Predict Probability: near 0, near 1, near ½ • Describe Probability • Theoretical Probability: determine • Ex Experiments: predict & record results (concrete materials) **Assessment**: Assign through Google Classroom. Solve question assigned and submit response.
	Data Management and Probability	BBS1 & BBS2	• Collect, Organize & Describe Data: real world issues • Evaluate Data: choose appropriate samples • Bar & Double Bar Graphs: construct and interpret • Mean, Median, Mode: concepts • Simple Outcomes: more / less likely • Predict Probability: near 0, near 1, near ½ • Describe Probability • Theoretical Probability: determine • Ex Experiments: predict & record results (concrete materials)
Key Stage III (VII –VIII)	**Numbers and Operations**	BBS1 and BBS 2	• Positive and negative exponents • Problems related to proportions • Problems related to percent • Problem related to mark up, SI and commission. • Problems related to square root • Multiplying and dividing integers • Adding and subtracting fractions • Multiplying and dividing fractions • Operation with rational numbers
	Geometry and Measurement		• Pythagoras theorem and its application in measurement and geometry • Area of a circle and associated problems

			• Tangrams and making rectangle/square/right-angled triangle using 3, 4, 5 and 7 shapes • Volume and Surface Area of a Rectangular Prism • Isometric Drawings and Orthographic Drawings • Transformations - Dilatations • and Combining Transformations
	Data Management and Probability	BBS 1 and BBS 2	• Difference between theoretical and experimental probability • Random sampling • Complementary events and simulation • Representing data using circle graphs, box and whisker plots • Scatter plots to express relation between two variables **Assessment**: Assign through Google Classroom. Solve question assigned and submit response.
	Patterns and Algebra		• Solving Linear Equations • Describing relationship • Linear Polynomial **Assessment**: Assign through Google Classroom. Solve question assigned and submit response.
Key Stage IV (IX- X)	**Numbers and Operations**	BBS1 and BBS 2	***Matrices*** • Concept of Matrix • Adding, Subtracting Matrices and Multiplying Matrices ***Networks*** • Concept of networks • Solving network problems ***Financial Mathematics*** • Making purchasing decisions • Simple and compound interest • Taxation
	Geometry and Measurement		***Symmetry*** • 2-D and 3-D Reflectional Symmetry ***Constructions*** • Perpendiculars and Bisectors • Medians and Altitudes ***Efficient design*** • 2-D Efficiency and 3-D Efficiency

			Defining Trigonometric Ratios • The Sine, Cosine, and Tangent Ratios • Trigonometric Identities ***Applying Trigonometric Ratios*** • Calculating Side Lengths and Angles • Angles of Elevation and Angles of Depression • Areas of Polygon
	Data Management and Probability	BBS 1 and BBS 2	***Data Involving One Variable*** • Histograms and Stem and Leaf Plots • Histograms and Box and Whisker Plots • Data Distribution ***Data Involving Two Variables*** • Correlation and Lines of Best Fit • Non-Linear Data and Curves of Best Fit ***Probability*** • Dependent and Independent Events • Calculating Probabilities
	Patterns and Algebra		***Linear Functions and Relations*** • Linear Functions • Applications of Linear Functions • Graphs of Linear Inequalities • Solving Systems of Linear Equations using comparison, substitution and elimination strategies ***Graphing Functions*** • Graphs of Quadratic Functions in • Transforming Quadratic Function Graphs ***Solving Non- Linear Equations*** • Solving Quadratic Equations by Factoring
Key Stage V (XI – XII)	**Algebra**	BBS1 and BBS 2	***Binomial Theorem*** • Binomial expansion for positive integral indices; use of Pascal's triangle; and the binomial theorem, • i.e. (x + y)n = nC0xn + nC1xn-1y + … + nCnyn • Binomial theorem for the expansion of binomial expressions having negative or fractional indices ***Remainder and Factor Theorem*** • Meaning of Rational Integral Function • Remainder Theorem and Factor Theorem ***Quadratic Equations and Functions*** • Solution of Quadratic equations by factorization and use of their

			graphs/sketches, and formula method • Nature of roots – real, complex roots, equal roots • Sum and Product of roots • Forming quadratic equations with given roots and related data ***Determinants of order 2 and 3*** • Minors and Co-factors of a determinant • Expansion of a determinant • Properties of a determinant and their use in the evaluation of a determinant • Product of determinants (without proof); • Conditions for consistency of 3 equations in two variables • Solution of simultaneous equations in 2 or 3 variables using Cramer's rule ***Matrices of order m x n, where m, n≤3*** • Types of Matrices • Operations: Addition/Subtraction (Compatibility); Multiplication by a scalar; Multiplication of two matrices (Compatibility) • Adjoint and inverse of a matrix • Application of Matrix multiplication • Use of matrices to solve simultaneous linear equations in 2 or 3 unknowns **Assessment:** • Students can submit pictures of completed tasks through social media platforms such as telegram/whatsapp etc and/or google classroom • They can make models and submit/reach to a designated place so that teachers can collect and assess
	Trigonometry		**Angles and Arc lengths** • Angles: Convention of signs of angles; Magnitude of an angle; • Measures of angles; Circular measures • The relation $S = r\theta$, where θ is in radians; Relation between radians and degrees • Arc length and area of a sector of a circle **Trigonometric Functions** • Trigonometric ratios; Relationship between trigonometric ratios • Proving simple trigonometric identities • Signs and limits of trigonometric ratios • Trigonometric ratios of standard angles and allied angles • Periods of trigonometric functions • Graphs of simple trigonometric functions (only sketches) • Practical problems based on angle of elevation and depression • (in 2 - D)

			Properties of Triangles • Sine Rule (including ambiguous case for triangles) and Cosine Rule • Projection formula • Napier's Formula for the area of a triangle (Proof and use) **Compound and Multiple Angles** • Addition and Subtraction formulas: Sin (A ± B); Cos (A ± B); Tan (A ± B); Tan (A + B + C), etc • Double angle, triple angle, half angle and one third angle formula as special cases • Sums and differences as products: e.g $Sin\ C + Sin\ D = 2\ Sin\ \frac{(C+D)}{2} Cos \frac{(C-D)}{2}$ • Product to sums or differences: e.g. 2 SinA CosB = Sin (A + B) + Sin (A - B) etc • Conditional identities (involving angles of triangles) **Inverse Trigonometric functions** • Meaning of inverse trigonometric functions ($Sin^{-1}x$, $Cos^{-1}x$, $Tan^{-1}x$, $Cot^{-1}x$, $Cosec^{-1}x$, $Sec^{-1}x$) • Principal values (use of graphs in explanation) • Properties of inverse trigonometric functions (without proof) **Assessment:** They can make models and submit/reach to a designated place so that teachers can collect and assess
Key Stage V (XI – XII)	**Calculus**	BBS1 and BBS 2	***Functions*** • Concept of real valued functions; Domain and Range; • Classification of functions; Inverse functions; • Sketch of graphs of exponential functions, logarithmic functions, step functions, and simple trigonometric functions like Sinx, Cosx, and Tanx ***Limits and Continuity*** • Notion and meaning of limits; • Fundamental theorems on limits; • Limits of algebraic and trigonometric functions • Continuity of a function at a point x = a, and continuity of a function in a range ***Differentiation*** • Meaning and geometrical interpretation of derivatives; • Differentiation from first principle; • Derivative of simple algebraic and trigonometric functions and their formulae; • Derivative of sums, differences, products and quotients of functions; • Derivatives of trigonometric, logarithmic, and exponential functions

		BBS1 and BBS 2	• Derivatives of composite, absolute value, implicit and parametric functions • Interchange of independent and dependent variables • Differentiating function with respect to another function • Logarithmic differentiation • Successive differentiation up to 2nd order • Maxima and Minima and application of maxima and minima to practical problems • Application of derivatives: Equation of tangent and normal; Approximation; Rate measure; • Derivatives of inverse trigonometric functions reducible to simple form by substitution ***Integration*** • Indefinite integral: integration as the inverse of differentiation; • Anti-derivatives of polynomials and functions like $(ax + b)^n$, Sin(x), Cos(x), Sec2(x), Cosec2(x) • Integration by simple substitution for simple polynomial functions and simple trigonometric functions • Standard method of integration of 1/x, e^x, Tan x, Cot x, Sec x, Cosec x, $(ax + b)^n$, where n∈Q • Integration using substitution, using partial fractions and by parts • Integrals of the type Sin2x dx, Sin3x dx, Cos2x dx, Cos3x dx, $f'(x)[f(x)]^n$ dx • Definite integral as a limit of sum • Properties of Definite Integrals • Application of definite integrals - area of a curve included between x or y axis, volume of revolution about the x-axis or y-axis or about a line ***Differential Equations*** • Meaning. Order and Degree of differential equation; • Solution of differential equation of 1st order and 1st degree • Variable separable • Homogenous equations and equations reducible to homogenous form; $\frac{dy}{dx} + Py = Q$, where P and Q are functions of x only • Solution of differential equations of second order $\frac{d^2y}{dx^2} = f(x)$ **Assessment:** • Students can submit pictures of completed tasks through social media platforms such as telegram/whatsapp etc and/or google classroom

			• They can make models and submit/reach to a designated place so that teachers can collect and assess
Key Stage V (XI – XII)	**Co-ordinate Geometry**	BBS1 and BBS 2	**Points and their coordinates in 2-Dimensions** • Cartesian system of coordinates • Distance formula, Section formula • Centroid of a triangle, In-center of a triangle • Area of a triangle using its three vertices, Area of a quadrilateral • Slope or gradient of a line • Angle between two lines • Conditions of perpendicularity and parallelism of two lines **The Straight line** • Various forms of equation of lines: point slope form; two points form; intercept form; perpendicular/normal form; • general equation of a line; slope/gradient; • distance of a point from a line; distance between parallel lines; • Angles between two lines; • equations of lines bisecting the angle between the lines; Identical Lines • Family of lines: • Lines parallel to $ax + by + c = 0$ are of the form $ay + bx + k = 0$; • Lines perpendicular to $ax + by + c = 0$ are of the form $ay - bx + k = 0$; • Any line through the intersection of two lines L1 and L2 is of the form $L1 + KL2 = 0$, where $K \in R$ **Pairs of Straight Lines** • General equation of a family of lines passing through the intersection of two lines L1 and L2: $L1 + kL2 = 0$, $k \in R$; finding k using additional condition • General equation of second degree in x and y representing a pair of lines • Conditions for general second degree equation to represent a pair of straight lines; Conditions for two lines to be perpendicular or parallel • Point of intersection and angle between two lines represented by a second degree equation in x and y • Equation of the bisector of the angle between a pair of given straight lines **Conics** • As a section of a cone • Definition and understanding of Foci, Directrix, Latus Rectum • Recognition of Equation of a Circle, Parabola, Ellipse and Hyperbola in standard form • Finding the equation for a conic when focus, directrix, and eccentricity or related data are given

		BBS1 and BBS 2	• Finding basic information like foci, directrix, etc from a given equation. **Equations of Circles** • Equation of a circle in: Standard form; diameter form; general form; parametric form • Find the centre and the radius of a circle from given equation • Finding the equation of a circle, given 3 non-collinear points; and given other sufficient data **Theorems on Circles** • Theorems on chords of a circle • Theorems on arcs and angles • Theorems on angles in alternate segment • Theorems on congruent arc and chords • Theorems on tangent lines and circles **Points and their co-ordinates in 3-Dimensions** • Distance between two points; Section and mid-point formulas; • Direction cosines and direction ratios of a line; • Angle between two lines; • Conditions for lines to be parallel or perpendicular **Plane** • General equation of a plane, as ax + by + c = 0, where a, b, c are direction ratios of the normal to the plane • Equation of a plane: One-point form; Normal form; Intercept form • Distance of a point from a plane • Angle between two planes, and angle between a line and a plane • Equation of a plane though the intersection of two planes • Finding the equation of a plane given a point and direction cosine/ratios of the normal and other sufficient data **Assessment:** • Students can submit pictures of completed tasks through social media platforms such as telegram/whatsapp etc and/or google classroom • They can make models and submit/reach to a designated place so that teachers can collect and assess
Key Stage V (XI – XII)	**Data management and probability**	BBS1 and BBS 2	**Measures of Central Tendency** • Mean, Median, Mode; finding by direct methods, formulas, and graphs **Dispersion** • Range: Quartiles, inter quartiles • Standard deviation - by direct method, short cut method and step deviation method; the meaning of Standard deviation should be emphasized **Measures of dispersion**

			• Meaning of dispersion; quartile deviation; standard deviation, coefficient of variation; Mean deviation from the mean or median • Combined mean and standard deviation of two groups only **Correlations** • Definition and meaning of correlations coefficient • Use of scatter diagram and Line of best fit • Calculation of coefficient of correlation by Karl Pearson's method for ungroup data • Calculation of rank correlation coefficient by Spearman's method, for both repeating and non-repeating data • Calculation of regression coefficient and the two lines of regression by the method of least squares; use of lines of regression for prediction **Probability** • Random experiment and their outcomes • Events: sure events, impossible events, mutually exclusive events, independent and dependent events • Definition of probability of an event • Laws of probability: addition and multiplication laws; conditional probability. **Assessment:** Students can submit pictures of completed tasks through social media platforms such as telegram/WhatsApp etc. and/or google classroom They can make models and submit/reach to a designated place so that teachers can collect and assess

4. SCIENCE

(General Science, Physics, Chemistry, Biology and Environmental Science)

Key Stage	Topics/Theme	Pedagogy/Strategies/Tools	Remark/Scope
3 (VII-VIII)	**Life Processes**	**BBS-I and BBS- II** ✓ Use webinar session (Zoom app). ✓ Conduct live teaching through the zoom app. ✓ Record lesson through the feature available in Zoom app. ✓ Share the video through other social media (WhatsApp, WeChat, YouTube that students are accessible). **Assessment** • Use worksheet. • Assign through Google Classroom. • Solve questions assigned and submit response.	• Cell, tissues, organs, organ system and organism • Process and parts of digestive system. • Respiratory organs, process of breathing and respiration • Photosynthesis, factors affecting photosynthesis • Asexual and sexual reproduction in plants and animals.
	Materials and their Properties	**BBS-I and BBS- II** **Strategies:** ✓ Interactive Lecturing ✓ Cooperative learning ✓ Peer teaching ✓ Blended learning ✓ Mobile learning ✓ Ubiquitous learning ✓ Collaborative work through google drive, google classroom, slack etc. **Assessment** • Use worksheet. • Assign through Google Classroom. • Solve questions assigned and submit response.	• Elements of atomic numbers from 1 to 30 with names and symbols, metals and non-metals. • Atomic structure, mass number, atomic number, isotopes and arrangement of atoms during chemical reaction. • Homogenous and heterogeneous mixture and their separation technique. • Acids and bases in the fruits and food items. • Reactions of metals and bases (including metal carbonates) with common acids (word equations and chemical equations.)
	Physical Processes	**BBS-I and BBS- II** Pedagogy and Strategies: ✓ Interactive Lecturing ✓ Cooperative learning ✓ Peer teaching ✓ Collaborative work through google drive, google classroom, slack etc.	• Turning force, its application to levers and relate it to the working of simple machines • Relationship between force, area and pressure and its application in people's daily life • Density, relative density, and relate it to everyday life

		Assessment • Use worksheet. • Assign through Google Classroom. • Solve questions assigned and submit response.	• Work, energy and power, and relationship between work, force and distance. • Current, voltage and resistance calculation using Ohm's Law, common electrostatic phenomena, direct current (d.c.) and alternating current (a.c.). • Formation of an image by spherical mirrors and lenses, prove that the white light is a composite light.
4 (IX-X)	**Life Process**	**BBS-I and BBS- II** ✓ Web-based ICT tool such as Phet, Virtual Lab, MyPhysicsLab, Physics Classroom ✓ Use webinar session (Zoom app). ✓ Conduct live teaching through the zoom app. ✓ Record lesson through the feature available in Zoom app. ✓ Share the video through other social media (WhatsApp, WeChat, YouTube that students are accessible). ✓ Maintain journal of lesson learnt. ✓ Use webinar session. ✓ Use Edcite database to assign the task and grade. ✓ Maintain journal. **Assessment** • Use worksheet. • Assign through Google Classroom. • Solve questions assigned and submit response.	• Mitosis and meiosis. • Composition and functions of blood, structure and function of heart and blood vessels, structures and functions of the nervous system. • Insulin, adrenalin and sex hormones. • Functions of plant hormones in the control of plant's growth and development. • Structure and function of DNA. • Interdependence, adaptation, competition and predation the distribution and relative abundance of organisms in a habitat • Organisation interactions (Predation, Competition, Parasitism, Commensalism) • Levels of biodiversity and Importance of biodiversity • Concept and principles of Sustainable development
	Materials and their Properties	**BBS-I and BBS- II** Google classroom, video tutorial, WeChat, etc. **Assessment** • Use worksheet. • Assign through Google Classroom. • Solve questions assigned and submit response.	• Boyle's Law, Charles' law and simple calculations based on the laws • Covalent bond, ionic bond and metallic bond • Alkane , alkene and alkyne • Carbon cycle and nitrogen cycle and their significance • Periodic table and periodicity
	Physical Processes	Pedagogy and Strategies: **BBS-I and BBS- II** ✓ Interactive Lecturing ✓ Cooperative learning ✓ Peer teaching ✓ Collaborative work through google drive, google classroom, slack etc	• Speed, velocity, acceleration, terminal velocity and laws of motion. • Principle of moments to solve problems involving forces acting in two dimensions. • Density of irregular solids by Archimedes' principle. • Application of Pascal law• • Work, power and the efficiency of a machine(simple calculation)

		Assessment • Use worksheet. • Assign through Google Classroom. • Solve questions assigned and submit response.	• Ohm's Law and simple calculations. • Working of electric motor and generators • Current and flow of electrons • Electromagnetic spectrum, reflection, refraction and diffraction of electromagnetic spectrum.
5(XI and XII)	**Life Process**	**BBS-I and BBS- II** ✓ **Strategies:** ✓ Interactive Lecturing ✓ Cooperative learning ✓ Peer teaching ✓ Blended learning ✓ Mobile learning ✓ Ubiquitous learning ✓ Collaborative work through google drive, google classroom, slack etc. **Assessment** • Use worksheet. • Assign through Google Classroom. • Solve questions assigned and submit response.	• Biomolecules (carbohydrates, proteins, fats, and DNA and RNA). • Structure of the mammalian heart; and explain the main substances transported by the circulatory system. • Antagonistic skeletal muscles on the joints and the sliding filament model of muscular contraction • Transmission of nerve impulse through myelinated neuron. • Negative and positive feedback mechanisms of hormonal action. • Structure and function of the mammalian brain and spinal cord. • Formation of urine in the kidney, including ultrafiltration in the renal capsule and selective re-absorption in the proximal convoluted tubule. • Immune response, the roles of the body's primary defense against pathogens • Photosynthesis as a process, in which, light energy is used to produce complex organic molecules in the two-stage process in the chloroplasts. • Semi-conservative mechanism of DNA replication and production of messenger RNA in transcription • Genetic mutation and its importance. • Role of mitosis and meiosis. • Process of fertilization to form embryo and the process of implantation. • Pollination and the mechanism to ensure the cross pollination, and describe the double fertilization and the structural changes which occur after fertilisation. • Solving the puzzles of monohybrid and dihybrid crosses, incomplete dominance, codominance and multiple alleles

			• Gene cloning via genetic engineering (fragments of DNA can be produced by the conversion of mRNA to cDNA, using reverse transcriptase) and PCR. • Process of carrying out genetic fingerprinting and its application. • Selection or forces of natural selection: stabilizing (sickle-cell anaemia in malarial countries), directional (antibiotic resistance in bacteria) or disruptive (the two morphs of the peppered moth, Biston betularia). • Factors that contribute to speciation and the differences between sympatric speciation and allopatric speciation. • Role of gene banks; impacts of unsustainable cropping practices, overgrazing, deforestation and intensive farming, including the use of fertilizers, and herbicides.
	Materials and their Properties	**BBS-I and BBS- II** Google classroom, video tutorial. WeChat, etc. **Assessment** • Use worksheet. • Assign through Google Classroom. • Solve questions assigned and submit response.	• s, p, d and f orbitals and block elements • Coordinate bonding • Shape of the molecules based on the concept of hybridisation • Electronegativity and Polar molecules • Homologous series and IUPAC nomenclature • Isomerism • Addition and substitution and with reference to alkanes , alkenes and alkynes • Oxidation of primary, secondary and tertiary alcohols • Substitution and elimination reactions in haloalkanes • Structure and nomenclature of aromatic compounds(benzene and their derivatives) • Electrophilic substitution reaction in aromatic compounds • Formaldehyde, acetaldehyde and benzaldehyde and their simple properties • Carboxylic acid, the derivatives of the acids and their simple properties • Amines and amino acids • First and second law of Thermodynamics , entropy and enthalpy • Collision Theory and factors affecting the rate of chemical reactions • Lechatlier ‘s principle with reference to chemical equilibrium

			• Ideal and non -ideal solution, vapour pressure and Raoult's law • Bronsted and Lowry concept of acid and base,strength of acid and base in terms of Ka and Kb, pH and buffer solution and the mechanism of buffer, • Redox reaction and electrochemical cells • Radioactive decay and half life • Importance of mass spectrometry and chromatography
	Physical Processes •	Strategies: **BBS-I and BBS- II** ✓ Interactive Lecturing ✓ Cooperative learning ✓ Peer teaching ✓ Collaborative work through google drive, google classroom, slack etc **Assessment** • Use worksheet. • Assign through Google Classroom. • Solve questions assigned and submit response.	• Resultant forces and components of two coplanar vectors by using a vector triangle • Derivation of kinematics equations for acceleration in a straight line • Basic concept of projectile motion • Newton's three laws of motion and relate to everyday phenomena, • Fluid resistance and surface tension in capillary tubes • Bernoulli's principle and Stoke's Law • Poisson's ratio for the expansion of materials under stress • Hooke's law and the force constant. • Equation of potential energy and kinetic energy to prove the law of conservation of energy. • Centripetal acceleration and centripetal force, • Equation $v_{max} = (2rf) A$ for calculating the maximum speed of simple harmonic oscillator, total energy, kinetic energy and the potential energy of a system. • Mean translational kinetic energy of an atom of an ideal gas • Gravitational potential and the escape velocity of a body. • Coulomb's law and electrical charge. • Capacitors in series and in parallel circuits • Force on current conductor placed in a magnetic field • Magnetic flux (B), Faraday's and Lenz's law • Electric current, potential difference and resistance and Kirchhoff's laws • Types of semiconductors. • Reflective index and image due to refraction and reflection. • Huygen's Principle • Principle of superposition, constructive and destructive interference • Diffraction and polarization. • Communication systems • Photon model of electromagnetic radiation.

			• Electron diffraction to determine the structures of crystalline • Hydrogen emission spectrum • Quark model of hadron. • Spontaneous and random nature of radioactive decay • Einstein's mass –energy and binding energy • Kepler's law and Newtonian gravitation. • Astrophysical plasma.

Note: Refer the science curriculum framework while preparing the lesson.

5. ENVIRONMENTAL SCIENCE

Key Stage	Themes/Topics		Pedagogy/Strategies/Tools	Remarks / scope
5 Key Stage	**System in Nature Chapter**	**Ecosystem – Structure and functions**	✓ Use webinar session (Zoom app). ✓ Share the video through other social media (WhatsApp, WeChat, YouTube that students are accessible). Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Spheres of the Earth • Biomes and Ecosystem Biodiversity and Endemism • Bhutan's rich biodiversity and ecosystem services
		Balance in Nature	✓ Use Google Classroom. ✓ Use e-library. ✓ Maintain journal. Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Energy Flow in an Ecosystem • Biogeochemical cycles • Disturbances and ecological succession.
5 Key Stage	**Environmental Issues and Concern**	**People and Environment**	✓ Use YouTube lesson Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Dependency on Natural Resources • Interdependency of humans and environment Land degradation
		Natural resource degradation	✓ Maintain journal regarding the natural resources degradation. ✓ Refer newspapers and write feedbacks and opinion. Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Natural Resources and its Exploitation Ecological Footprint
		Pollution	✓ Use Webinar session Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Natural Resources and its Exploitation • Health Hazards of Toxic Substances • Understanding Climate Change
		Climate Change Disaster and Environment 1.	✓ Use webinar session. ✓ Use online quiz for assessment. Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Climate Change • Phenology and Climate Change • **Disaster and its Reduction**

5 Key Stage	**Natural Resource Management**	**Disaster and Environment**	✓ Use Google Classroom. ✓ Maintain journal Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Hazards and Disasters • Disaster reduction • Hazards and Disasters
		Biodiversity and Measurement Land use and management	✓ Use webinar session (Zoom app). Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Measuring Biodiversity Management-Land and water • Water conservation techniques • Water conservation for irrigation
		Biodiversity Conservation	✓ Digital story telling. ✓ Question and answer Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Conservation of Biodiversity • Biodiversity Conservation (Protected Areas) and Poverty Alleviation
		Water and Land Management & Energy Resources	✓ Use Environmental Profile ✓ Maintain journal of energy uses at home. Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Land Waste Management • Entrepreneurship and Waste Management • Methods to conserve energy
		Energy Conservation	✓ Use Webinar session ✓ Quiz Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Energy Management and Efficiency Energy Efficiency and Technology. • Energy Efficient ways and devices
5 Key Stage	**Sustainable Development**	**Environment and Development**	✓ Use Google Classroom ✓ Share YouTube links. Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• Development • Green Economy
		Sustainable Development	✓ Use webinar. ✓ Maintain journal. Assessment with thought provoking summary 1- 2 questions BBS1/BBS2	• GNH and Sustainable Development Sustainable Development • Relationship - Development and Environment

6. SOCIAL SCIENCES

(History, Geography and Economics)

Key Stage	Themes	Topics	Pedagogy/Strategy/tools	Remarks/Scope
I (PP-III) II (IV-VI)	Key stage I and II to be focused on literacy and numeracy	Key stage I and II to be focused on literacy and numeracy	NA	In key stage I and II, focus will be on literacy and numeracy subjects
III (VII-VIII)	1. Resources and Sustainable development	Population and its importance	BBS I &II YouTube, google classroom (1-2 thought provoking and competency based questions to assess student learning)	Death rate, birth rate, natural change, causes of change and impact of change.
	2. Spatial interaction	Trade, Transport and Communication	BBS I &II YouTube, google classroom (1-2 thought provoking and competency based questions to assess student learning)	Concept of trade, transport and communications
	3. Government, Civil Society and Media in Bhutan	State and Government	BBS I &II YouTube, google classroom (1-2 thought provoking and competency questions to assess student learning)	Forms of Government Constitution and Citizens
	4. The Earth and its people	Settlement and its evolution	BBS I &II YouTube, google classroom (1-2 thought provoking and competency based questions to assess student learning)	Types, patterns of settlement and classification
	5. Bhutan as a Nation-State and Importance of Monarch	Institution of Monarchy	BBS I &II YouTube, google classroom (1-2 thought provoking competency based questions to assess student learning)	Zhabdrung and Chhoesid system (Making a Nation-State) Institution of Monarchy and the successive Druk Gyalpos
	6. Economic sectors	Economic sectors	BBS I &II YouTube, google classroom (1-2 thought provoking and competency based questions to assess student learning)	Sectors of economy
IV (IX-X)	1. Resources and Sustainable development	GNH, Economic Growth and Development	BBS I &II YouTube, google classroom	Population and economy, economic growth

			(1-2 thought provoking and competency based questions to assess student learning)	
	2. Spatial interaction	Trade, Transport and Communication	BBS I &II YouTube, google classroom (1-2 thought provoking and competency based questions to assess student learning)	Concept of trade, domestic and international trade, balance of payment, development of communication and transport in Bhutan, impact of trade, transport and communications
	3. Government, Civil Society and Media in Bhutan	Bhutanese Government System, world development since 1945 (Role of UN)	BBS I &II YouTube, google classroom (1-2 thought provoking and competency based questions to assess student learning)	The Legislature, The Executive , The Judiciary, the Constitutional Bodies and Local Government) World development since 1945 – Important topic in World History
	4. The Earth and its people	Climate and its impact	BBS I &II YouTube, google classroom 1-2 thought provoking and competency based questions to assess student learning) (	Factors affecting climate, winds, climatic zones of Bhutan, climate change, climate change and environmental problems
	5. Bhutan as a Nation-State and Importance of Monarch	Institution of Monarchy	BBS I &II YouTube, google classroom (1-2 thought provoking and competency based questions to assess student learning)	Institution of Monarchy and the successive Druk Gyalpos
	6. Economic sectors	Role of economic sectors for the economy	BBS I &II YouTube, google classroom (1-2 thought provoking and competency based questions to assess student learning)	Introduction to Economics, Understanding economy, Factor earning, Public finance,
V (XI-XII)	1. Resources and Sustainable development	GNH, Economic Growth and Development	BBS I &II YouTube, google classroom (2-3 thought provoking and competency based questions to assess student learning)	Bhutanese economy, Money and Banking, Public finance, development planning
	2. Spatial interaction	Trade, Transport and Communication	BBS I &II YouTube, google classroom (2-3 thought provoking and competency based questions to assess student learning)	Means of transport and communication, impact of transport and communications
	3. Government, Civil Society and Media in Bhutan	Bhutanese Government System	BBS I &II YouTube, google classroom	Society, State and Nation Forms of government Constitution

			(2-3 thought provoking and competency based questions to assess student learning)	Role of the Monarch in a Democratic Constitutional Monarchy
	4. The Earth and its people	Climate and its impact	BBS I &II YouTube, google classroom (2-3 thought provoking and competency based questions to assess student learning)	World climate, climate types and zones, impact of climate change
	5. Bhutan as a Nation-State and Importance of Monarch	Institution of Monarchy-Role of Monarch in Democratic Constitutional monarchy	BBS I &II YouTube, google classroom (2-3 thought provoking and competency based questions to assess student learning)	Role of Monarch in Democratic Constitutional monarchy Bhutan and international Organisations
	6. Economic sectors	Role of economic sectors for the economy	BBS I &II YouTube, google classroom 2-3 thought provoking and competency based questions to assess student learning)	National Income, Bhutanese economy.

7. ACCOUNTANCY

Key Stages	Topics	Strategies/tools	Remarks/Scopes
V (XI-XII)	**Accounting Theory**	BBS I & BSS II	• Identification of stakeholders in business • Underlying assumptions and convention used in preparation of financial statement • Qualitative characteristics of useful financial information • Elements of financial statement • Meaning and purposed of AS **Eg. Assessment:** Study a financial statement of a company and validate it quality.
	Accounting Equation	BBS I & BSS II	• **Identification of accounts in a transaction and prepare equation** • **Relate accounting equation with financial statement** **Eg. Assessment:** Solve a practical problem from the textbook
	Journal, Ledger and Trial balance	BBS I & BSS II	• **Vouchers** • **Categorise of accounts** • **Dual concepts** • **Pass journal entries** • Prepare ledger and trial balance **Eg. Assessment:** Solve a practical problem from the textbook
	Accounting for PPE	BBS I & BSS II	• **Recognition criteria for PPE** • **Depreciation** • **Prepare depreciation schedule** **Eg. Assessment:** Make a visit around your place and identify different items of PPE.
	Financial Statements	BBS I & BSS II	• **Elements of financial statement** • **Prepare financial statement** **Eg. Assessment:** Solve a practical problem
	Costing	BBS I & BSS II	• Classify the elements of cost- material cost, labour cost and overheads. • Prepare cost sheet. **Eg. Assessment:** Make a visit to a construction place in your area and identify different cost involved.

8. COMMERCE

Key Stages	Topics	Strategies/tools	Remarks/scope

V(XI-XII)	**Business, Trade and Commerce**	BBS I and II	• Classification of human activities
			  ○ Business
			  ○ Employment
			  ○ Profession
			• Classification of business
			  ○ Industry
			  ○ Commerce
			• Commerce and its branches
			• Purpose of business organisations
			• Types of business organisation
			  ○ Soles proprietorship
			  ○ Partnership
			  ○ Company
			• Cooperatives
			• Concepts of trade
			• Types of trade
			Eg. Assessment: a) Identify different types of trades in your locality
			b) Why trade is essential for our livelihood?

	Financing		• Types of finance for the business • Sources of business finance • Services of commercial banks **Eg. Assessment:** a) Identify different banks offering finance to business in the country b) Think of a situation where there is no bank in the country
	Management and Communication		• Meaning of management • Functions of management • Need for effective business communication • Different modes of business communication • Principle of effective business communication • Barriers to communication **Eg. Assessment:** Considering your house as business entity, relate management household with business organisation.

	Marketing		• Concepts of marketing • Importance of marketing for business • Different medium for marketing **Eg. Assessment:** Identify different marketing carried for a product around your place and design a marketing strategy for a product

9. MEDIA STUDIES

Key satge	Topics/Themes	Pedagogy/Strategy/ Tools	Scope/Remarks
Key Stage 5	**Media and Information Literacy**	❖ Lessons on the identified learning areas would be aired through BBS ❖ Tutorial clip (Video) would be delivered through YouTube play list or any other social media group. ❖ Audio materials shall be delivered through sound cloud or other social media group ❖ Print materials shall be delivered through appropriate social media: email, Facebook, ❖ Group Discussion amongst the students for exchange of ideas would be encouraged through appropriate social media: WeChat group, WhatsApp group, telegram group **1. Assessments** Assignments such as; write-ups, textual analysis, etc. would be assigned and evaluated through Google Classroom. Questions & Answer would be conducted at the end of learning areas to check students' understanding using Google Classroom Online quiz questions would be used for students' self-assessment through internet tool like google form.	➢ Evolution of Media ➢ Types of Media ➢ Information and information Literacy
	Understanding Media Messages and Information		➢ What is Media Literacy? ➢ Importance of Media Literacy ➢ Nature of Media Messages
	Media and Language		➢ Basic Persuasion Techniques ➢ Key Questions to Look at Media ➢ Visual Literacy ➢ Film Language
	Representation in Media and Information		➢ Who Should Media Represent? ➢ Determining News Values ➢ Analyzing Representation ➢ Methods and Technology Media Adopt
	Traditional Media and New Media		➢ TM and NM – Collaboration for Success ➢ Digital as New Media ➢ Use of NM Technologies in Society ➢ New Media World and Citizenship Orientation ➢ Uses of Multimedia Tools
	Journalist Code of Ethics and Research Ethics		➢ Principles of Journalism ➢ Research Ethics verses Media Ownership ➢ Process of New Publication
	Media and Global Village		➢ Global Economy and Media Ownership ➢ Technology Convergence and Media Conglomerates

Note: All the lessons will be planned based on the curriculum framework.

10.RIGZHUNG

གནས་རིམ།	ལྟབ་སྟོན་འབད་དགོ་པའི་དོན་ཚན་གཅོ་ཅན།	སློབ་སྟོན་ཐབས་ལམ།
སློབ་རིམ་༡༡ པ་དང་ སློབ་རིམ་༡༢པ།	སྤྱི་འཛུགས། སློབ་རིམ་༡༡ པའི་ནང་ལུ་ ལེའུ་༡ པ་ལས་ ལེའུ་༤ པ་ཚུན། སློབ་རིམ་༡༢ པའི་ནང་ལུ་ ལེའུ་༥ པ་ལས་ ལེའུ་༨ པ་ཚུན། (སློབ་ཁྲག་གི་གནས་ཚད་དང་འཁྱིལ་ཏེ་ བརྟེད་དོན་གལ་ཅན་ཚུ་གདམ་འཐུ་འབད་དེ་ སློབ་དེབ་བཟོ་ཡོད་མི་ལས་སྟོན་ནི།)	སྤྱི་འཛུགས་གི་སློབ་སྟོན་ སྒྲ་གཅུང་འབད་དེ་བཀྲམ་ནི། སྔོན་མ་ལས་ བྱམ་སློབ་དཔོན་ཚུ་གིས་ ཆོས་བཤད་གནང་ཡོད་མི་ཚུ་ཡང་ བསྟུསཔ་གཏད་དེ་ བཀྲམ་ནི། WeChat, Facebook, YouTube, Google ཚུ་ གི་ཐོག་ལུ་ མཐོང་ཐོས་མཁོ་ཆས་ཚུ་བཟོ་སྟེ་བཀྲམ་ཐོག་ལས་ ལྟབ་བཙུགས་ནི།
	སྟན་དགེ། **སློབ་རིམ་༡༡ པའི་ནང་ལུ་སྟོན་དགོཔ།** རང་བཞིན་བརྟེད་པ་ མཚུངས་གསལ་ དཔེ་རྒྱུན་གསུམ། **སློབ་རིམ་༡༢ པའི་ནང་སྟོན་དགོཔ།** དཔེ་རྒྱུན་བསྒྲུར་ཞིབ་དང་ གཟུགས་ཅན་ཐྱི་རྒྱུན། (སློབ་ཁྲག་གི་གནས་ཚད་དང་འཁྱིལ་ཏེ་ འབད་ཚུགས་པའི་ རྒྱུན་ལེགས་ཤོམ་ཚུ་གདམ་འཐུ་འབད་དེ་ སློབ་དེབ་བཟོ་ཡོད་མི་ལས་སྟོན་ནི།)	སྟན་དགའ་གི་སློབ་སྟོན་ སྒྲ་གཅུང་འབད་དེ་བཀྲམ་ནི། WeChat, Facebook, YouTube, Google ཚུ་གི་ཐོག་ལུ་ མཐོང་ཐོས་མཁོ་ཆས་ཚུ་ བཟོ་སྟེ་བཀྲམ་ཐོག་ལས་ ལྟབ་བཙུག་ནི། སྟན་དགའ་དང་འབྲེལ་བའི་ རྒྱབ་རྟེན་ཚུ་ ཡོངས་འབྲེལ་ཐོག་ལས་ འཐོབ་ཚུགས་པ་དང་ ཡོངས་འབྲེལ་ཁ་བྱང་ཚུ་ སྟོན་བྱེད་ནི།
	མདོན་བརྗོད། **སློབ་རིམ་༡༡ པའི་ནང་ལུ་སྟོན་དགོཔ།** མཐོ་རིས་སྟེ་ཚན་ལས་ ས་འོག་གི་སྟེ་ཚན་ཚུན། **སློབ་རིམ་༡༢ པའི་ནང་སྟོན་དགོཔ།** ས་གཞིའི་སྟེ་ཚན་ལས་ མཇུག་བྱང་ཚུན། (སློབ་ཁྲག་གི་གནས་ཚད་དང་འཁྱིལ་ཏེ་ དོན་ཚན་གདམ་འཐུ་འབད་དེ་ སློབ་དེབ་བཟོ་ཡོད་མི་ལས་སྟོན་ནི།)	མདོན་བརྗོད་ཀྱི་བཤད་པ་ སྒྲ་གཅུང་འབད་དེ་བཀྲམ་ནི། WeChat, Facebook, YouTube, Google ཚུ་གི་ཐོག་ལུ་ མཐོང་ཐོས་མཁོ་ཆས་ཚུ་ བཟོ་སྟེ་བཀྲམ་ཐོག་ལས་ ལྟབ་བཙུག་ནི། རང་གིས་ལྟག་སྟེ་ ཀ་གོ་ཚུགས་པའི་ཆོས་ཚན་ཞིན་ལས་ དེ་སྟེ་ལྟབ་དགོ་པའི་ལམ་སྟོན་མཐོང་ཐོས་ཅིག་བཟོ་ནི།

ལྷག་སྤྱོད་འབད་ཐབས་དང་དབྱེ་ཞིབ་ཐབས་ལམ།	སློབ་ཕྲུག་ཚུ་གིས་ རིག་གཞུང་གིའི་ཚོས་ཚན་འདི་ རང་གི་ཁྱིམ་ནང་ རྒྱུང་མཐོང་དང་ ཡོངས་འཛིལ་ འགྲུལ་འཕྲིན་ སློག་རིག་མཁོ་ཆས་ཚུ་གི་ཐོག་ལས་ དང་ རང་གིས་འབད་ སྤྱོད་བསྟེད་དེ་ལྷག་དགོཔ་དང་། རང་གི་ཞམ་དང་སྤྱན་ཆ་ ཤེས་མི་ཚུ་ལས་ རྒྱབ་སྐྱོར་ལེན་ཏེ་ ལྷག་དགོཔ་ཨིན། དེ་སྦེ་ལྷག་སྤྱོད་འབད་ཚར་བའི་ཤུལ་ལུ་ དབྱེ་ཞིབ་འབད་ཐངས་དེ་ཡང་ རང་ཉིད་དབྱེ་ཞིབ་ཀྱི་ཐབས་ལམ་ཚུ་ སྟོན་ཏེ་ ཤེས་མ་ཤེས་དབྱེ་ཞིབ་འབད་ནིའི་ ཐབས་ཤེས་ཚུ་སྟོན་ནི་དང་། མཐའ་མཇུག་གི་ཚོས་རྒྱུགས་དེ་ཡང་ ལས་འགུལ་དང་ འདྲི་ལན་ ཡང་ ཡོངས་འཛིལ་google ཚུ་གི་ཐོག་ལས་ དུས་ཐོག་ལུ་ ཚོས་རྒྱུགས་ལེན་ནིའི་ ཐབས་ལམ་མ་འདྲཝ་ཚུ་གི་ཐོག་ལས་ དབྱེ་ཞིབ་འབད་ནི་ཨིན།

Education in Emergency

PRIORITIZED CURRICULUM

KEY STAGE 2: Classes IV - VI

1. DZONGKHA

ཆོས་ཚན་་་་་སྐྱ་རིམ་དང་རྩོམ་རིག། **སློབ་རིམ་་་བཟུ་གཅིག་པ།**

གནས་ཚད།	སློབ་ཚན།	དོན་ཚན།	ལས་དོན།	ཤྭེད་ཚད
• རྩོམ་རིག་ འབྲི་བཀོད་ཀྱི་ལམ་ལུགས་དང་ འབྲི་རྒྱལ་མ་འཛུ་བའི་འབྲི་ཐངས་རྒྱུ་དང་འཁྲིལ་ཏེ་ བྱི་ཚུགས་དགོ། • གཞན་གྱིས་ རྩོམ་སྒྲིག་འབད་ཡོད་པའི་ རྩོམ་རིག་ཁུངས་སྤན་རྒྱ་གི་ཁྱད་ཆོས་རྒྱ་ ཁོང་རའི་ རྩོམ་འབྲི་ནང་ལུ་ ལག་ལེན་ འཐབ་ཚུགས་དགོ། • འབྲི་རྩོམ་གྱི་སྐབས་ ཞིབ་འཚོལ་འབད་ནི། འཆར་གཞི་བཟོ་ནི་ ཟིན་བྲིས་བཏུབ་ནི་ བསྒྲུབ་ཞིབ་འབད་ནི་ ཁྱབ་དག་ཆུབ་ཐངས་ཀྱི་ འབྲི་རྩོམ་ལམ་ལུགས་རྒྱ་ རང་སྐྱོབས་ཀྱིས་ ལག་ལེན་ འཐབ་ཚུགས་དགོ། • རྩོད་ཁའི་ནང་ལེའུ་པའི་ དངོས་རྩོམ་དང་ འཆར་རྩོམ་གྱི་དུས་དེབ་རྒྱ་ རང་སྐྱོབས་ཀྱིས་ཤྭག་སྟེ་ གོ་བ་ ལེན་ཚུགས་དགོ།	འབྲི་རྩོམ།	• འཁྲུལ་སྣང་ཅན་གྱི་གློག་བརྟན། • རྒྱུ་མཐོང་གི་ཁན་གཏེད།	དོན་ཚན་འདི་ཤྭབ་ཚར་ཁ་ དེཁ་གི་གནད་དོན་རྒྱ་ཚི་ སྐོར་ ཏ་གོ་སྟེ་ འབྲི་སྒྲབ་འབད་ཚུགས། • འབྲི་རྩོམ་གྱི་ཁྱད་རྣམ་དང་བསྟུན་འབྲི་ཚུགས། • སློབ་དེབ་ཀྱི་འབྲི་རྩོམ་ཤྭག་ཁེབ་འབད་ཚུ་ གས།	༡༥
• ཁཡ་རྩོམ་དང་ སྐྱན་རྩོམ་ བརྗ་དོན་ཡིག་འབྲེལ་ཚུ་ ཆོགས་བཅད་ ཆོག་ཤྭག་ སྒེལ་མ་གསུམ་ གྱི་ཐོག་ལས་ ཁོས་འབབ་ཤྭན་ཏོག་ཏོ་འབད་ བྱེ་ཚུགས་དགོ། • དངགི་ཏན་སྐངདང་ མཐོངསྐང་ ཐོས་སྐང་ སྒོངཆོངགྱི་ཁྱད་རྣམ་དང་ གནད་དོན་ཚུ་ གཞིནམ་འབད་བགོད་ནི་གི་དངོས་རྩོམ་དང་ ཡངན། སྤྲོ་བཏགས་ཀྱི་འཆར་རྩོམ་ཚུ་འབྱེ་ཚུལ་ ཉམས་འཐུང་གྱི་ ཁོས་འབབ་དང་ཤྭན་པའི་ཆོག་གི་ཐོག་ལས་ ཡིག་ལམ་དུ་ བགོད་ཚུགས་དགོ། • གསལ་བཤད་དང་གསལ་ཁུ་ཚུ་འབད་ཞ་དང་ རྩོད་སྤྲ་དང་ ཆོག་གི་གཅད་མཚམས་ཚུ་ ཚུལ་མཐུན་འབད་ ལག་ལེན་འཐབ་སྟེ་ སྤྲད་ཚུགས་དགོ།	སྐྱན་རྩོམ།	• སྤྲིར་གཏངངོསྤྲོད། • ཞབས་ཐོ། • བསྒབ་ཟླ།	• རྩོམ་རིག་གི་གོ་དོན་དང་རྩོམ་རིག་གི་དབྱེ་བ་ཚུ་ ཚུགས་དགོ • ཞབས་ཐོའི་ཆོག་གཞི་ཚུ་དང་བསྟུན་གདངས་དབྱངས་འཐུངས་འཐེན་འབད་ཚུགས། • གནས་སྐངས་དང་བསྟུན་ལུང་འདེན་འབད་ཚུགས། • ཆོས་སྐད་ཚུ་རྩོངཁའི་ཐོག་འཛིལ་ཚུགས།	༡༥
• རྩོམ་རིག་ འབྲི་བཀོད་ཀྱི་ལམ་ལུགས་དང་ འབྲི་རྒྱལ་མ་འཛུ་བའི་འབྲི་ཐངས་རྒྱུ་དང་འཁྲིལ་ཏེ་ བྱི་ཚུགས་དགོ། • གཞན་གྱིས་ རྩོམ་སྒྲིག་འབད་ཡོད་པའི་ རྩོམ་རིག་ཁུངས་སྤན་རྒྱ་གི་ཁྱད་ཆོས་རྒྱ་ ཁོང་རའི་རྩོམ་ འབྲི་ནང་ལུ་ ལག་ལེན་ འཐབ་ཚུགས་དགོ།	སྐུང་དང་ གཏམ་རྒྱུད།	• སྐུང་གི་ངོསྤྲོད་ལས་ སྐུང་གི་འབྲི་ཤོག་ཚུགས། • ཡ་བྷ་མ། • ཨ་པའི་ཁ་ཆེམས།	• ཤེས་ཚད་དང་བསྟུན་པའི་རྩོམ་རིག་སྐུང་ཚུ་ ཤྭག་སྟེ་འབྲི་ཐངས་ཀྱི་རིག་རྩལ་དབྱེ་དཔྱད་འབད་ཚུགས། • སྐུང་གི་ཁྱད་རྣམ་ཚུ་འབྲི་ཚུགས། • ཁྱད་རྣམ་ཚང་བའི་སྐུང་གསར་རྩོམ་འབད་	༡༥

• འཕེལ་ཡོད་ གནད་དོན་ཚུ་གི་སྐོར་ལས་ མི་ཆེ་འཐིང་ཆུང་གསུམ་དང་གཅིག་ཁར་ གནས་སྟངས་དང་བསྟུན་པའི་ ཞེ་སྡང་ལ་ཚོགས་ཚུ་འཐོབ་ལམ་དང་འཁྲིལ་ཏེ་ ཉན་སྒྲབ་ འབད་ཚུགས་དགོ།			ཚུགས།	
• རྩོམ་རིག་ཚུ་ཕྱག་སྟེ་ཆོས་དང་ལམ་སྲོལ་ལུ་བརྩི་མཐོང་གི་བསམ་སྤྱོད་ཤེས་ཡོན་དང་ཆོས་སྲིད་ཀྱི་ བྱ་གཞག་ཚུ་ལུ་རྣམ་དཔྱོད་ཀྱི་ཤེས་རབ་ཐོབ་ཚུགས་དགོ། • ཆོས་སྐད་ནང་ཡོད་པའི་ཡིག་ཆ་དང་དེ་ཆ་ཚུ་ཕྱག་ཚུགས་དགོ།	བཤེས་སྤྲིངས།	• ངོས་སྤྲོད། • རྣམ་ཐར། • མཚན་དོན་ལས་དོན་ཤེད་ཀྱི་ གཏིད་སྤང་ཚུལ་ཚུན།	• ཆོས་དང་ལམ་སྲོལ་གྱི་བསམ་སྤྱོད་ཤེས་ཡོན་ལུ་བརྩི་མཐོང་བསྒྲིད་ཚུགས། • ཆོས་སྐད་ཀྱི་ཤིང་ཚོགས་ཚུ་རྩོད་ཁའི་ནང་འཐེ་ཚུགས། • ལས་རྒྱུ་འབྲས་ལུ་ངོས་ཤེས་སྤེལ་ཚུགས།	༢༥

གནས་ཚད།	སློབ་ཚན།	དོན་ཚན།	ལས་དོན།	སྐྱེད་ཚད།
• ཡིག་བཟོ་ཚུ་ སྟོམས་འགྲིགས་ཀྱི་ཐོག་ལས་ བཀའ་ཐངས་དང་ མཚོ་རྒྱན་མ་འདྲཝ་ཚུ་ ཚུལ་མཐུན་འབད་ ལག་ལེན་འཐབ་སྟེ་ བི་ཚུགས་དགོ། • རྩོམ་རིགས་ འབྲི་བཀོད་ཀྱི་ལམ་ལུགས་དང་ འབྲི་ཚུལ་མ་འདྲ་བའི་འབྲི་ཐངས་ཚུ་དང་འཁྲིལ་ཏེ་ བི་ཚུགས་དགོ། • གཞན་སྐྱེག་ རྩོམ་སྐྱེག་འབད་ཡོད་པའི་ རྩོམ་རིགས་ཁྲབས་ལྟ་ནས་ རྩོམ་རིགས་ཚུ་ ཁོང་རའི་ རྩོམ་འབྲི་ནང་ལུ་ ལག་ལེན་ འཐབ་ཚུགས་དགོ། • འབྲི་རྩོམ་ཀྱི་སྐབས་ ཞིབ་འཚོལ་འབད་ནི། འཚར་གཞི་བཟོ་ནི་ ཟིན་བྱིས་བཏུབ་ནི་ བསྡུར་ཞིབ་འབད་ནི་ དཔྱེ་དཔག་ཅུབ་ཐངས་ཀྱི་ འབྲི་རྩོམ་ལམ་ལུགས་ཚུ་ རང་སྟོབས་ཀྱིས་ ལག་ལེན་ འཐབ་ཚུགས་དགོ།	ཐེ་ནེའི་རིག་རྩལ་ཤོག་ཁའི་ རྩོམ་རིག་	རྩོམ་བཏང་འབྲི་རྩོམ་གྱི་དཔྱ་བ་དང་རོ་སྟོང་འབྲི་ཐངས་ ཚུལ་དང་ དེའི་ནང་གསེས་ རྩོམ་གྲེལ་འབྲི་རྩོམ་དང་ རྒྱས་བཤད་འབྲི་རྩོམ་གཉིས་ཀྱི་ཁྱད་རྣམ་དང་འབྲི་ཐངས་ཚུ་ཤ་གོ་སྟེ་ རང་སྟོབས་ཀྱིས་ བི་ཚུགས་དགོ།	༩༠
• གཞུང་འབྲེལ་དང་ བརྡ་འབྲེལ་ ཁྱིམས་འབྲེལ་གྱི་ཡིག་རིགས་ཚུ་གི་དཔྱེ་བ་དང་ འབྲི་ཐངས་ཚུ་ ཤ་གོ་སྟེ་ ལག་ལེན་འཐབ་ཚུགས་དགོ།	ཐེ་ནེའི་རིག་རྩལ་ཡིག་འགྱུལ།	• སྤྱི་ཙི་ངོ་སྤྲོད། • སྐེར་ངོད་ཡིག་འགྱུལ། • གན་རྒྱ།	• ཞུ་ཡིག་གི་འབྲི་བགོད་ལྟར་ཐེ་ཚུགས། • ཁད་ཚད་ལྟན་པའི་གན་ཡིག་ཐེ་ཚུགས། • ལས་ལུགས་གཉིས་ཀྱི་ཐོག་ཞུ་ཡིག་ཐེ་ཚུགས།	༡༠
• རྣམ་དབྱེ་བརྒྱད་དང་ ལྷག་བཅས་ རྒྱན་སྤྲད་ མིང་མཐའ་ཚུ་གི་ དོན་ཀྱི་འཛུག་ཚུལ་ ལག་ལེན་འཐབ་ཚུགས། • ཀེ་སྤྲ་ ཀ་སྤྲ་ དང་སྤྲ་ ད་སྤྲ་ དེ་སྤྲ་ སྤྱི་སྤྲ་ བདག་སྤྲ་ དགག་སྤྲ་ ཅིད་ཡི་གི་ འཛུག་ཚུལ་ ཤེས་ཚུགས། • ཚིགས་བཅད་ཀྱི་ བརྗོད་པ་ཚུ་དང་ རྩོམ་ཀྱི་རིགས་ཚུ་ བྱིཌ་ད་ ཡིག་སྟེབ་ཚ་ཐམ་འབད་ ལག་ལེན་ འཐབ་ཚུགས། • མིང་དང་བྱ་ཚིག་ ཞེ་སའི་སྦྱོར་ཚུལ་དང་ གདམ་ངའི་ཀྱི་མིང་ཚིག་ཚུ་ ལག་ལེན་ འཐབ་ཚུགས།	སྐད་ཡིག་དང་ཡིག་སྒྱོར།	• སྐད་ཡིག་གི་འབྲུང་ཁུངས་ལས་ རྩོད་ཐའི་མིང་ཚིག་ཚུན། • རྣམ་དབྱེ་བརྒྱད། • ཡི་གུ་ཙོ་མའི་དབྱེ་བཤད། • རྩོམ་སྐད་དང་རྩོད་ཐའི་རྩོད་སྤྲའི་ ཁྱད་པར་ལས་བདག་སྤྲ་ཚུན། • ཚིག་གྲོགས་ཤེག་ཞེག་ཅེག་གི་ ཐོབ་ཐངས།	དོན་ཚན་འདི་ཁྲབ་ཚར་ཤ་ དེ་གི་གནད་དོན་ཚུ་ སྐོར་ ཤ་གོ་སྟེ་ འབྲི་སྤྱབ་འབད་ཚུགས། • སྐད་ཡིག་གི་ཁྱད་རྣམ་སྤྱོད་ཚུལ་ཚུ་ཤེས་ཚུགས། • རྒྱལ་ཡོངས་སྐད་ཡིག་གི་ཁྱད་རྣམ་དང་འབྲུང་ཁུངས་ཚུ་ཤེས་ཚུགས། • ཚིགས་གྲོགས་ཅིག་ཞེག་ཤེག་གི་འཛུག་ཐངས་ ཚུ་ལག་ལེན་ཐབས་ཚུགས།	༧༠

གནས་ཚད།	སྐོབ་ཚན།	དོན་ཚན།	ལས་དོན།	སྤྱིད་ཚད
• རྩོམ་རིགས་ འབྲི་བཀོད་ཀྱི་ལམ་ལུགས་དང་ འབྲི་རྒྱལ་མ་འཛུ་བའི་འབྲི་ཐངས་རྒྱ་དང་འཁྱིལ་ཏེ་ སྤེ་རྒྱགས་དགོ། • གཞན་གྱིས་ རྩོམ་སྒྲིག་འབད་ཡོད་པའི་ རྩོམ་རིག་ཁྲངས་ལྡན་རྒྱ་གི་ཁྲད་ཆོས་རྒྱ་ ཁོང་རའི་རྩོམ་འབྲི་ནང་ལུ་ ལག་ལེན་ འཐབ་རྒྱགས་དགོ། • འབྲི་རྩོམ་གྱི་སྐབས་ ཞིབ་འཚོལ་འབད་ནི། འཆར་གཞི་བཟོ་ནི་ ཟིན་བྲིས་བཏུབ་ནི་ བསྒྲུར་ཞིབ་འབད་ནི་ དཔེ་དཔྱད་འབད་ནི་ ཁྲན་དག་རྒྱབ་ཐབས་ཀྱི་ འབྲི་རྩོམ་ལམ་ལུགས་རྒྱ་ རང་སྟོབས་ཀྱིས་ ལག་ལེན་ འཐབ་རྒྱགས་དགོ། • རྩོང་ཁའི་ནང་ཡོད་པའི་ དངོས་རྩོམ་དང་ འཆར་རྩོམ་གྱི་དུས་དེབ་རྒྱ་ རང་སྟོབས་ཀྱིས་ ལྷག་སྐྱེ་ གོ་བ་ ལེན་རྒྱགས་དགོ། • རྩོང་ཁའི་ དུས་དེབ་དང་ཡིག་རིགས་ གཅིན་ཀྱི་ཞིན་རྡུང་ རྩོད་སྤྲ་ གཅད་མཚམས་ ཚོག་མཚམས་རྒྱ་ རྒྱལ་དང་མཐུན་ཏྲིག་ཏྲ་འབད་ ལྷག་རྒྱགས་དགོ།	འབྲི་རྩོམ།	• འབྲི་རྩོམ་སྤྱིར་ གཏུང་ངོ་སྤྲོད་དང་ དབྱེ་བ་འབྲི་བགོ་ཀ། • ཚེ་སྡོག་གི་དབྱ་ རྩོད་སྒེང་ • རྒྱས་བཤད།	**དོན་ཚན་འདི་ལྷག་ཚར་ཤ་དུ་ འོག་གི་གནད་དོན་རྒྱ་རྒྱ་གི་རྣོར་ ཏ་ཞོ་སྟེ་ འབྲི་སྒྲབ་འབད་རྒྱགས།** •འབྲི་རྩོམ་གྱི་ ངོ་སྤྲོད་དང་དབྱེ་བ་ འབྲི་ཐངས་རྒྱ་ ཏ་ཞོ་སྟེ་འབྲི་སྒྲབ་འབད་རྒྱགས། •རྩོད་སྒེང་གི་ཁྲད་རྣམ་དང་འབྲི་ཐངས་ ཏ་ཞོ་སྟེ་ རྩོད་སྒེང་འབྲི་རྩོམ་བྱི་རྒྱགས། •རྒྱས་བཤད་འབྲི་རྩོམ་གྱི་ཁྲད་རྣམ་དང་འབྲི་ཐངས་ ཏ་ཞོ་སྟེ་ རྒྱས་བཤད་འབྲི་རྩོམ་བྱི་རྒྱགས།	༡༥%
• ཤལ་རྩོམ་དང་ སྐྱན་རྩོམ་ བརྡ་དོན་ཡིག་འབྲེལ་རྒྱ་ ཆོགས་བཅད་ ཆོག་ལྷག་ སྒེལ་མ་གསུམ་གྱི་ཐོག་ལས་ འོས་འབབ་ལྷན་ཏྲིག་ཏྲ་འབད་ སྤྱི་རྒྱགས་དགོ། • རང་གི་དྲན་སྐྱང་དང་ མཐོང་སྐྱང་ མོང་ཚོར་གྱི་ཁྲད་རྣམ་དང་ གནད་དོན་རྒྱ་ རྒྱ་ཁེའི་གཏམ་ཁ་ཤས་ཀྱི་འབྲི་ཐངས་ཡིན། སྤྲོ་བཏགས་ཀྱི་འཆར་རྩོམ་རྒྱ་འབྲི་ རྒྱལ་ ཉམས་འགྱུར་གྱི་ འོས་འབབ་དང་ལྷན་པའི་ཆོག་གི་ཐོག་ལས་ ཡིག་ལམ་དུ་ བཏོད་རྒྱགས་དགོ། • གསལ་བཤད་དང་གསལ་ཁུ་རྒྱ་འབད་ཤ་དུ་ རྩོད་སྤྲ་དང་ ཆོག་གི་གཅད་མཚམས་རྒྱ་ རྒྱལ་མཐུན་འབད་ ལག་ལེན་འཐབ་སྟེ་ སྤྲབ་རྒྱགས་དགོ། • འཁེལ་ཡོད་གནད་དོན་རྒྱ་ནང་ ལུང་འཛེན་དང་ དཔེ་གཏམ་ སྤྲ་གཏམ་བཏུགས་ཏྲ་ སྤྲབ་མི་རྒྱ་ ཁྱབ་ཏྲ་ ཏ་ཞོ་རྒྱགས་དགོ་ཡའི་ཁའ་ དེ་དང་བསྟུན་ཡའི་ཁན་རྒྱ་ འོས་འབབ་དང་ བསྟུན་ཏྲ་ རྒྱས་བཤད་དང་ བཙུད་བསྟུས་གང་འོས་ཀྱི་ཐོག་ལས་ སྤྲབ་རྒྱགས་དགོ།	• སྤྱིར་གཏང་རྩོམ་གྱི་ངོ་སྤྲོད་དང་ དབྱེ་བ་ རྩོམ་རྒྱབ་ཐངས་རྒྱ་ ཏ་ཞོ་སྟེ་ ལག་ལེན་འཐབ་རྒྱགས། • རྩོམ་རིག་གི་ཞོ་དོན་དང་རྩོམ་རིག་གི་དབྱེ་བ་ཕྱེ་རྒྱགས་དགོ། • སྤྲ་གཏམ་དང་ སྐོར་གཏམ་ དབྱེ་གཏམ་དང་ལུང་འཛེན་རྒྱ་ དབྱེ་བ་ཕྱེས་ཏྲ་ ལག་ལེན་འཐབ་རྒྱགས། • ཡུལ་དུས་གནས་སྟངས་དང་འཁྱིལ་བའི་ རྩོམ་རྒྱབ་རྒྱགས།	༡༥%

• རྩོམ་རིགས་ འབྲི་བཟོད་ཀྱི་ལམ་ལུགས་དང་ འབྲི་ཚུལ་མ་འདྲ་བའི་འབྲི་ཐངས་ཚུ་དང་ འཁྲིལ་ཏེ་ སྤི་ཚུགས་དགོ། • གཞན་གྱིས་ རྩོམ་སྒྲིག་འབད་ཡོད་པའི་ རྩོམ་རིགས་ཁྲབས་ཚུ་གི་ཁྱད་ཆོས་ཚུ་ ཁོང་རའི་རྩོམ་འབྲི་ནང་ལུ་ ལག་ལེན་ འཐབ་ཚུགས་དགོ། • འབྲེལ་ཡོད་ གནད་དོན་ཚུ་གི་སྐོར་ལས་ མི་ཆ་འབྲིང་ཆུང་གསུམ་དང་གཅིག་ཁར་ གནས་སྐབས་དང་བསྟུན་པའི་ ཞེ་ས་དང་ཚལ་ཆ་ཚུ་འཐོབ་ལམ་དང་འཁྲིལ་ཏེ་ ཉན་སྒྲུབ་ འབད་ཚུགས་དགོ། • བྱེ་སྒྲུབ་པའི་སྐབས་ལུ་ གནད་དོན་དང་འཁྲིལ་ཏེ་ སྐད་ཀྱི་སེང་ཚབ་དང་ གཟུགས་ཀྱི་ རྣམ་འགྱུར་ སྒྲུབ་ཐངས་ཀྱི་ ཉམས་འགྱུར་ཚུ་གི་ ཁྱད་པར་དང་སྦྲན་པའི་སྒོ་ལས་ ཉན་སྒྲུབ་ འབད་ཚུགས་དགོ།	སྤྱང་དང་ གཏམ་རྒྱུད།	• ར་གམ་རིན་པ་ཆེ། • བཀྲིས་དང་དཔལ་སྦྱོན།	•སྤྱང་གི་ངོ་སྤྲོད་དང་དབྱེ་བ་ སྤྱང་འཕྲིན་ཐངས་ཚུ་ ཏ་ཚོ་སྤེལ་ འབྲི་སྒྲུབ་འབད་ཚུགས། •ཤེས་ཚད་དང་བསྟུན་པའི་ སྤྱང་ཚུ་ཤྲག་སྤེལ་ འབྲི་ཐངས་ཀྱི་རིགས་རྟགས་ དབྱེ་དཔྱད་འབད་ཚུགས། •སྤྱང་གི་ཁྱད་རྣམ་ཚུ་ཏ་ཚོ་སྤེལ་ རང་གིས་ཡང་ ཁྱད་རྣམ་ཚང་བའི་ སྤྱང་གསར་རྩོམ་ འབད་ཚུགས། •སྤྱང་བསྒྱར་ཞིབ་འབད་ཚུགས།	༡༥%
• རྩོམ་རིགས་ཚུ་ཤྲག་སྤེལ་ ཆོས་དང་ལམ་སྟོལ་ལུ་ ཅིས་ནཚོང་གི་ བསམ་སྤྱོད་ཤེས་ཡོན་དང་ ཆོས་སྲིད་ཀྱི་ཐ་གཞག་ཚུ་ལུ་ རྣམ་དཔྱོད་ཀྱི་ཤེས་རབ་ འབོད་ཚུགས་དགོ། • ཆོས་སྐད་ནང་ཡོད་པའི་ ཡིག་ཆ་དང་ དཔེ་ཆ་ཚུ་ ཤྲག་ཚུགས་དགོ།	བཤེས་སྤྱིངས།	• མི་ཁོམས་པའི་ གནས་བརྒྱུད་ལས་ ཤུ་མིན་གྱི་ སྤུག་བསྡལ་ཚུན།	• ཆོས་དང་ལམ་སྟོལ་གྱི་བསམ་སྤྱོད་ཤེས་ཡོན་ལུ་བརྟེ་མཐོང་བསྒྲིད་ཚུགས། • ཆོས་སྐད་ཀྱི་ མིངཆོག་ཚུ་ རྩོད་པའི་ནང་ སྤེལ་ཚུགས། • ལས་རྒྱུ་འབྲས་ལུ་ དེས་ཤེས་སྐྱེ་ཚུགས།	༡༥%

གནས་ཚད།	སློབ་ཚན།	དོན་ཚན།	ལས་དོན།	ཚེད་ཚད
• རྩོམ་རིགས་ འབྲི་བཀོད་ཀྱི་ལམ་ལུགས་དང་ འབྲི་རྒྱལ་མ་འཛུ་བའི་འབྲི་ཐངས་རྒྱ་དང་འཁྲིལ་ཏེ་ བྱི་ཚུགས་དགོ། • གཞན་ཀྱིས་ རྩོམ་སྒྲིག་འབད་ཡོད་པའི་ རྩོམ་རིག་ཁུངས་ལྟན་རྒྱ་གི་ཁྱད་ཆོས་རྒྱ་ ཁོང་རའི་ རྩོམ་འབྲི་ནང་ལུ་ ལག་ལེན་ འཐབ་ཚུགས་དགོ། • འབྲི་རྩོམ་ཀྱི་སྐབས་ ཞིབ་འཚོལ་འབད་ནི། འཚར་གཞི་བཟོ་ནི་ ཟིན་བྲིས་བཏང་ནི་ བསྒྲུབ་ཞིབ་འབད་ནི། དབྱེ་དཔྱད་འབད་ནི། ཁུན་དག་ཀུབ་ཐངས་ཀྱི་ འབྲི་རྩོམ་ལམ་ལུགས་རྒྱ་ རང་སྟོབས་ཀྱིས་ ལག་ལེན་ འཐབ་ཚུགས་དགོ།	བྱི་ནི་འི་རིག་ རྟལ། འབྲི་རྩོམ།	རྩོམ་གླེང་འབྲི་རྩོམ། ཀུས་ཨཤད་འབྲི་རྩོམ རྒྱུད་སྐུལ་	སྤྱིར་བཏང་འབྲི་རྩོམ་གྱི་དབྱེ་བ་དང་རོ་སྤྲོད་ འབྲི་ཐངས་ཚུ་དང་ དེའི་ནང་གསེས་ རྩོད་གླེང་འབྲི་རྩོམ་དང་ ཀུས་ཨཤད་འབྲི་རྩོམ་གཞི་གྱི་ཁྱད་རྟམ་དང་འབྲི་ཐངས་ཚུ་ཤ་གོ་སྟེ་ རང་སྟོབས་ཀྱིས་ བྱི་ཚུགས་དགོ།	༡༠
• ཡིག་བཟོ་ཚུ་ སྟོམས་འགྱིགས་ཀྱི་ཐོག་ལས་ བཀལ་ཐངས་དང་ མགོ་རྒྱན་མ་འདྲཔ་ཚུ་ ཚུལ་མཐུན་འབད་ ལག་ལེན་འཐབ་སྟེ་ བྱི་ཚུགས་དགོ། • གཞུང་འབྲེལ་དང་ བརྡ་འབྲེལ་ ཁིམས་འབྲེལ་ཀྱི་ཡིག་རིགས་ཚུ་གི་དབྱེ་བ་དང་ འབྲི་ཐངས་ཚུ་ ཤ་གོ་སྟེ་ ལག་ལེན་འཐབ་ཚུགས་དགོ།	བྱི་ནི་འི་རིག་ རྟལ། ཡིག་འགྲུལ།	• ཞུ་ཚིག • གན་རྒྱ • ཞུ་ཡིག	• ཞུ་ཚིག་གི་འབྲི་བཀོད་ལྟར་འབྲི་ཚུགས། • ཁྱད་ཚད་ལྟན་པའི་གན་ཡིག་འབྲི་ཚུགས ལམ་ལུགས་གཅིས་ཀྱི་ཐོག་ཞུ་ཡིག་འབྲི་ཚུགས།	༡༠
• རྩོང་ཁའི་སྐད་ཡིག་གི་ དབྱོས་པ་དང་ཚན་ཐོགས་ ཁྱད་རྟམ་དང་སྒྲུབ་ཚུལ་ཚུ་ ཤེས་ཚུགས་དགོ། • རྩོང་ཁའི་ མིང་ཚིག་བརྩོད་པའི་རྣམ་གཞག་ ལག་ལེན་ འཐབ་ཚུགས་དགོ། • སྒྲུར་བྱ་ཡི་གེའི་ རྣམ་གཞག་དང་ ཕྲད་རྟམ་དབྱེ་ཚུ་ ལག་ལེན་ འཐབ་ཚུགས་དགོ། • བདག་གཞན་དུས་གསུམ་དང་ བྱ་ཁྱེད་ལས་གསུམ་དབྱེ་བ་ཤེས་ཏེ་ ལག་ལེན་ འཐབ་ཚུགས་དགོ། • ཚོས་སྐད་དང་ རྩོང་ཁའི་རྩོད་སྒྲུབ་དང་ ཡིག་སྡེབ་ ཕྲད་དང་རྟམ་དབྱེའི་ ཁྱད་པར་ཚུ་ ཤེ་ཚུགས་དགོ། • གདམ་ངག་དང་ རྩོད་སྒྲུ་ཤོགས་མཚུངས་ཀྱི་ ཡིག་སྡེབ་འཁྲུལ་སྦྱོང་ཚུ་ ཤེས་ཚུགས་དགོ།	སྐད་ཡིག་དང་ ཡིག་སྦྱོར།	• སྐད་ཡིག་གི་ཁྱད་རྟམ་སྒྲུབ་ཚུལ • འབྲུག་གི་རྒྱལ་ཡོངས་སྐད་ཡིག་གི་ ཁྱད་རྟམ། • ཡི་ཀ • སྒྲ་གདངས་ • རྩོད་སྒྲུ། • སྐད་ཡིག་སྒྲུབ་ཚུལ • མཚུངས་གསལ་གྱི་སྒྲུ • ཐེ་ཚོམ་གྱི་སྒྲུ • དུས་གསུམ་སྐོར • རྟམ་དབྱེ་བརྒྱད་བསྒྲུར་ཞིབ	• སྐད་ཡིག་གི་ཁྱད་རྟམ་སྒྲུབ་ཚུལ་ཚུ་ཤེས་ཚུགས། • རྒྱལ་ཡོངས་སྐད་ཡིག་གི་ཁྱད་རྟམ་ཚུ་ཤེས་ཚུགས། • མཚུངས་གསལ་དང་ཐེ་ཚོམ་གྱི་དུས་བཅོག་ཚུགས། • ཡི་ཀ་བྱིཌ་དང་ ཕྲད་རྟམ་དབྱེ་ཚུ་ འཛོལ་བ་མེད་པར་བྱི་ཚུགས།	༡༠

2. RIGZHUNG

ཚོས་ཚན་""""རིག་གཞུང་གདམ་ཁའི་ཚོས་ཚན། **སློབ་རིམ་""བཟུ་གཅིག་པ།**

གནས་ཚད།	སློབ་ཚན།	དོན་ཚན།	ལས་དོན།	ཉིད་ཚད
• ནང་པའི་རིག་གཞུང་གི་ ཡོན་ཏན་གྱི་གཞི་འགྱམ་ཚུད་ཚུགས་ནི། • ཚོས་སྐད་ནང་ཡོད་པའི་ རྩོམ་རིག་ཚུ་གི་ གོ་དོན་རྟོགས་ཚུགས་དགོ། • ཚོས་དང་འཁྲིལ་བའི་ མིངཚིག་ཐ་སྙད་ཚུ་གི་ གོ་དོན་ལེན་ཚུགས་ནི། • ནང་པའི་ཚོས་ཀྱི་བརྩི་མཐོང་དང་ སྤང་བླང་གི་གནས་ཚུ་ ཧ་གོ་སྟེ་འབྲི་སྤྲབ་འབད་ཚུགས་ནི།	ལེའུ་དང་པ། སྤྱི་བ་བསྡེབ་པ་ ཕན་ཡོད་ཀྱི་ལེའུ།	• མཚན་དོན། • འགྲུར་ཕྱག། • རྣམ་ཐར། • ལུས་སེམས་ཀྱི་རྟེན་ རྟེད་པར་དཀའ་ཚུལ། • བརྟེན་པ་ཉར་ཚུབ་སེམས་ཀྱི་ཕན་ཡོན་ རྒྱས་པར་བརྗོད་པ། སེམས་བསྒྲེད་རྒྱུད་ལྡན་གྱི་ བཤེས་གཉེན་ལ་བསྟོན་པ།	ལེའུ་འདི་ལྟབ་ཚར་ཤ་དུ་ འོག་གི་གནད་དོན་ཚུ་གི་སྐོར་ ཏ་ཚོ་སྟེ་ འབྲི་སྤྲབ་འབད་ཚུགས། • བསྟན་བཅོས་རྩོམ་པ་པོའི་ ངོ་མཚར་བའི་རྣམ་ཐར་བདུན་དང་ ཀུན་སློང་ཀུན་སྤྱོད་ དགོས་སོགས་ཚོས་བཞི་ཚུ་གི་སྐོར་ འབྲི་སྤྲབ་འབད་ཚུགས་དགོ། • མཚན་དོན་དང་ མཚོད་བརྗོད་ དམ་བཅའ་ཚུ་གི་ ཁུངས་དང་དགོས་པ་ཚུ་ བཤད་ཚུགས་དགོ། • དཔལ་འབྱོར་རྟེད་པར་དཀའ་ཚུལ་དང་ སྐོན་འཇུག་ཐུབ་སེམས་ཀྱི་ཕན་ཡོན་ཚུ་ བཤད་པ་རྩུབ་ཚུགས་དགོ།	༡༥
• ནང་པའི་རིག་གཞུང་གི་ ཡོན་ཏན་གྱི་གཞི་འགྱམ་ཚུད་ཚུགས་ནི། • ཚོས་སྐད་ནང་ཡོད་པའི་ རྩོམ་རིག་ཚུ་གི་ གོ་དོན་རྟོགས་ཚུགས་དགོ། • ཚོས་དང་འཁྲིལ་བའི་ མིངཚིག་ཐ་སྙད་ཚུ་གི་ གོ་དོན་ལེན་ཚུགས་ནི། • ནང་པའི་ཚོས་ཀྱི་བརྩི་མཐོང་དང་ སྤང་བླང་གི་གནས་ཚུ་ ཧ་གོ་སྟེ་འབྲི་སྤྲབ་འབད་ཚུགས་ནི།	མི་མཐུན་ཕྱོགས་སྡེག་པ་ བཤགས་པའི་ལེའུ།	སྟོབས་བཞི། ཡན་ལག་གསུམ། མཚོད་པའི་དབྱེ་བ་ལྔ།	ལེའུ་འདི་ལྟབ་ཚར་ཤ་དུ་ འོག་གི་གནད་དོན་ཚུ་གི་སྐོར་ ཏ་ཚོ་སྟེ་ འབྲི་སྤྲབ་འབད་ཚུགས། • ཡན་ལག་བདུན་ལས་ ཕྱག་འཚལ་བ་དང་ • མཚོད་པའི་དབྱེ་བ། ཕན་ཡོན་ སྡེག་པ་བཤགས་ཐབས་ཚུ་གི་སྐོར་ལས་ འབྲི་སྤྲབ་འབད་ཚུགས་དགོ།	༡༥

• ནང་པའི་རིག་གཞུང་གི་ ཡོན་ཏན་ཀྱི་གཞི་འཛུམ་ཚུད་ཚུགས་ནི། • ཆོས་སྐད་ནང་ཡོད་པའི་ རྩོམ་རིག་ཚུ་གི་ གོ་དོན་རྟོགས་ཚུགས་དགོ། • ཆོས་དང་འབྲེལ་བའི་ མིང་ཚིག་ཐ་སྙད་ཚུ་གི་ གོ་དོན་ལེན་ཚུགས་ནི། • ནང་པའི་ཆོས་ཀྱི་བརྩེ་མཐོང་དང་ སྤང་བླང་གི་གནས་ཚུ་ ཀ་གོ་སྟེ་འབྲི་སྒྲབ་འབད་ཚུགས་ནི།	མཐུན་མོཊགས་བྱང་སེམས་ཡོངས་གཟུང་གི་ལེའུ།	• ཡན་ལག་ལྔག་མ་བཞི་ སྟོན་ཏུ་འགྲོ་བ། • ཉེར་ལེན་གྱི་སྟོན་འགྲོས་ བློ་སྦྱངས་པ། • དངོས་གཞི་བྱང་སེམས་ ཡོངས་སུ་བཟུང་བ། • མཇུག་རང་གཞན་ དགའ་བ་སྐྱེམ་པ།	ལེའུ་འདི་ལྟབ་ཚར་ཤ་དུ་ འོག་གི་གནད་དོན་ཚུ་གི་སྐོར་ ཀ་གོ་སྟེ་ འབྲི་སྒྲབ་འབད་ཚུགས། • ཡན་ལག་ལྔག་མ་བཞི་སྟོན་ཏུ་འགྲོ་བ། • ཉེར་ལེན་གྱི་སྟོན་འགྲོས་ བློ་སྦྱངས་པ། • དངོས་གཞི་བྱང་སེམས་ཡོངས་སུ་བཟུང་བ། • མཇུག་རང་གཞན་དགའ་བ་སྐྱེམ་ཚུལ།	༡༥
• ནང་པའི་རིག་གཞུང་གི་ ཡོན་ཏན་ཀྱི་གཞི་འཛུམ་ཚུད་ཚུགས་ནི། • ཆོས་དང་འབྲེལ་བའི་ མིང་ཚིག་ཐ་སྙད་ཚུ་གི་ གོ་དོན་ལེན་ཚུགས་ནི། • སྙན་ཚིག་དང་ རྒྱན་ཚིག་ཚུ་ འཁྲབ་སྟུང་དང་ སྡུང་ དག་སྟོམ་ཚུ་ནང་ ལག་ལེན་འཐབ་ཚུགས་ནི། • ཞབས་ཞུ་དང་ ཏྲི་ཟེ་ རྩད་མོ་ཚུ་ སྙན་ཚིག་བཏུགས་ཏེ་ སྟོམ་འབྲི་འབད་ཚུགས་ནི།	སྙན་དག་ལེའུ་བར་པ།	དོན་རྒྱན་སོ་ལྟའི་ངོ་སྤྲོད་ལས་ དཔེ་རྒྱན་བཅུ་པ་ རྣམ་བྱང་གི་དཔེ་ཚུན།	ལེའུ་འདི་ལྟབ་ཚར་ཤ་དུ་ འོག་གི་གནད་དོན་ཚུ་གི་སྐོར་ ཀ་གོ་སྟེ་ འབྲི་སྒྲབ་འབད་ཚུགས། • སྤྱི་ར་བཏང་སྙན་དག་གི་ལོ་རྒྱུས་དང་ སྟོམ་པ་ པོའི་མཚན་ སྟོམ་ཚུལ་གྱི་སྐོར། • མིང་བཏགས་ཚུལ་དང་ མཆོད་བརྗོད་ དགོས་སོགས་ཆོས་བཞི། • སྙན་དག་གི་ལུས་ བཅད་ ལྟག་སྟེལ་མ། • སྙན་དག་སྤྱི་ར་བཏང་གི་རྒྱན་ཚུ་ ངོས་འཛིན་འབད་ཚུགས་དགོ། • སྙན་དག་གི་སྐྱོན་སེལ་རྣམ་གཞག • རང་བཞིན་བརྗོད་པའི་རྒྱན་གྱི་དཔེར་བརྗོད། • རང་བཞིན་བརྗོད་པའི་རྒྱན་དང་ དཔེ་རྒྱན་ ༡༠པ་ཚུན་གྱི་མཚན་ཉིད་ ཀ་གོ་ཐོག་ལས་ དཔེར་བརྗོད་ཀྱི་དབྱེ་བ་ཚུ་ ངོས་འཛིན་འབད་ནི། • དཔེ་དང་དཔེ་ཅན་ཚུ་ ཁ་གསལ་འབད་ དཔྱེ་བ་ཕྱེ་ཚུགས་དགོ།	༡༥

• གདམ་འཐུ་འབད་ཡོད་པའི་ དོན་ཚན་ཚུ་གི་ཐོག་ལུ་ མིང་གི་རྣམ་གྲངས་ གསུམ་ལས་མ་ཉུངམ་རེ་ རེས་ཆིག་བཅས་ འཇི་སྐབ་འབད་ཚུགས་དགོ། • སྟན་རྩོམ་ནང་ལུ་ མདོན་བརྗོད་ཚུ་ལག་ལེན་འཐབ་སྟེ་ འཇི་སྐབ་འབད་ཚུགས་དགོ། • མིང་ཚུ་གི་ རྒྱབ་ཁྱངས་དང་ སྡུད་ཚུ་ འཇི་སྐབ་འབད་ཚུགས་དགོ། • སྟན་རྩོམ་རྒྱབ་པའི་སྐབས་ལུ་ མིང་གི་རྣམ་གྲངས་ཚུ་ འོས་འབབ་ལྟན་ཏོག་ཏོ་འབད་ བྱེ་ཚུགས་དགོ། • མདོན་བརྗོད་སློབ་སྦྱོང་དང་འབྲེལ་ཏེ་ ཆོས་སྐད་དང་རྗོང་ཁའི་ མིང་གི་ཐ་སྙད་མ་འདྲཝ་ཚུ་གི་ ཡོན་ཏན་གྱི་གཞི་འགྱམ་ འཐོབ་ཚུགས་དགོ།	མདོན་བརྗོད།	• རྒྱལ་བ་དང་བྱང་ཆུབ་སེམས་དཔའི་མཚན། • ལྷ་གནས་དང་ལྷའི་མིང་། ནམ་མཁའ་དང་གཟའ་སྐར་ལ་སོགས་པའི་མིང་།	• མིང་གི་རྣམ་གྲངས་ ༣ལས་མ་ཉུངམ་རེ་འཇི་སྐབ་འབད་ཚུགས་དགོ། • མིང་གི་རེས་ཆིག་ཚུ་ འཇི་སྐབ་འབད་ཚུགས་དགོ། • མིང་བཏགས་དགོ་པའི་ རྒྱུ་མཚན་དང་ དགོས་པ་བཤད་ཚུགས་དགོ། • མིང་ཚུ་གི་ རྒྱབ་ཁྱངས་དང་ སྡུད་ཚུ་ བཤད་ཚུགས་དགོ། • སྟན་རྩོམ་རྒྱབ་པའི་སྐབས་ལུ་ མིང་གི་རྣམ་གྲངས་ཚུ་ འོས་འབབ་ལྟན་ཏོག་ཏོ་འབད་ འཇི་ཚུགས་དགོ།	༢༠

གནས་ཚད།	སྒོམ་ཚན།	དོན་ཚན།	ལས་དོན།	ཤིད་ཚད།
• ནང་པའི་རིག་གཞུང་གི་ ཡོན་ཏན་གྱི་གཞི་འགྱམ་ཚུད་ཚུགས། • ཆོས་སྐད་ནང་ཡོད་པའི་ ཟོམ་རིག་ཚུ་གི་ གོ་དོན་རྟོགས་ཚུགས། • ཆོས་དང་འཁྲིལ་བའི་ མིང་ཚིག་ཐ་སྙད་ཚུ་གི་ གོ་དོན་ལེན་ཚུགས། • ནང་པའི་ཆོས་ཀྱི་བརྩེ་མཐོང་དང་ སྤང་བླང་གི་གནས་ཚུ་ ཏ་ཚོ་སྟེ་འབྲི་སྒྲབ་འབད་ཚུགས།	ལེའུ་ལྔ་པ། ལུས་སེམས་ལ་ཡང་ ཡང་བརྟག་པ་ཤེས་ བཞིན་ཀྱི་ལེའུ།	• ཤེས་བཞིན་ཀྱི་རྒྱུ་མཚན་མདོར་བསྟན་པ། • བསྒོམ་གཞི་ལེགས་ཉེས་སེམས་སུ་བསྟུ་ཚུལ། • སྒོམ་ཐེངས་དྲན་ཤེས་ རྒྱུད་ལ་བསྟེན་ཚུལ། • བསྒོམ་བྱ་སྐྱག་པའི་ཚུལ་ཁྱིམས་སྡུང་ཚུལ། ཤེས་ བཞིན་དོ་བོས་མཇུག་བསྟུ་བ།	ལེའུ་འདི་སྐྱབ་ཚར་ཤ་ དོ་གཱི་གནད་དོན་ཚུ་གི་སྐོར་ ཏ་ཚོ་སྟེ་ འབྲི་སྒྲབ་འབད་ཚུགས། • དྲན་ཤེས་ཀྱི་གོ་དོན། • དྲན་ཤེས་ཀྱི་དགོས་དོན། • དྲན་ཤེས་བསྟེན་ཚུལ། • ཚུལ་ཁྱིམས་ཀྱི་ངོ་བོ་དང་དབྱེ་བ། • སྐྱག་པའི་ཚུལ་ཁྱིམས་སྡུང་ཚུལ། • ཤེས་བཞིན་གྱི་ངོ་བོ།	༡༥
• ནང་པའི་རིག་གཞུང་གི་ ཡོན་ཏན་གྱི་གཞི་འགྱམ་ཚུད་ཚུགས། • ཆོས་སྐད་ནང་ཡོད་པའི་ ཟོམ་རིག་ཚུ་གི་ གོ་དོན་རྟོགས་ཚུགས། • ཆོས་དང་འཁྲིལ་བའི་ མིང་ཚིག་ཐ་སྙད་ཚུ་གི་ གོ་དོན་ལེན་ཚུགས། • ནང་པའི་ཆོས་ཀྱི་བརྩེ་མཐོང་དང་ སྤང་བླང་གི་གནས་ཚུ་ ཏ་ཚོ་སྟེ་འབྲི་སྒྲབ་འབད་ཚུགས།	ལེའུ་དྲུག་པ། འགལ་རྐྱེན་ཀྱིས་མི་ འཁྲུགས་པ་བཟོད་པའི་ ལེའུ།	• སྤང་བྱ་ཁོང་ཁྲོལ་སྤོང་ཚུལ། • གཉེན་པོ་བཟོད་པ་སྒོམ་ཚུལ། • བཟོད་ཡུལ་སེམས་ཅན་ལ་གྱས་ཚུལ།	ལེའུ་འདི་སྐྱབ་ཚར་ཤ་ དོ་གཱི་གནད་དོན་ཚུ་གི་སྐོར་ ཏ་ཚོ་སྟེ་ འབྲི་སྒྲབ་འབད་ཚུགས། • ཁོང་ཁྲོལ་སྤོངས་ཚུལ་དང་ • བཟོད་པ་སྒོམ་ཚུལ། • བཟོད་པའི་ངོ་བོ་དང་དབྱེ་བ། • བཟོད་པའི་ཕན་ཡོན།	༡༠
• དངོས་བསམ་འཆར་ཚུ་ ཆོག་ བཅད་སྐྱག་སྤེལ་མའི་ཐོག་ལས་ ཆོག་རྒྱན་བཙུགས་ཏེ་ ཟོམ་འབྲི་འབད་ཚུགས། • མཁས་པ་གཞན་ཀྱི་ སྐྱན་ཟོམ་ཚུ་གི་ གོ་དོན་རྟོགས་ཚུགས། • སྒོ་ལྡེའི་དབང་ཤེས་ཀྱི་ཚོར་ཉམས་ཚུ་ སྐྱན་ཆོག་གི་ལམ་ལས་ བརྟ་སྤྲོད་འབད་ཚུགས། • སྐྱན་ཆོག་དང་ རྒྱན་ཆོག་ཚུ་ འཁྲབ་སྡུང་དང་ སྡུང་ཟོམ་ནང་ལག་ལེན་འཐབ་ཚུགས།	སྐྱན་དགུ།	• མཐོས་པའི་དཔེ་ལས་ རྒྱུའི་དཔེ་ཚུན། • གཟུགས་ཅན་ཀྱི་ངོ་སྤྲོད། • བསྒྱས་པའི་གཟུགས་ཅན་དང་མ་བསྒྱས་པའི་ གཟུགས་ཅན། • རྒྱང་ལྡན་རྒྱུ་སྤྱིའི་ངོ་སྤྲོད།	ལེའུ་འདི་སྐྱབ་ཚར་ཤ་ དོ་གཱི་གནད་དོན་ཚུ་གི་སྐོར་ ཏ་ཚོ་སྟེ་ འབྲི་སྒྲབ་འབད་ཚུགས། • སྐྱན་དགཱི་རྒྱན་དང་ མིང་གི་རྣམ་གྲངས་ཚུ་ལག་ལེན་ འཐབ་སྟེ་ ཟོམ་བྱེ་ནི། • ཡུལ་དུས་གནས་སྐབས་དང་བསྒྱན་ཏེ་ ཆོག་ ལྷག་སྤེལ་མ་གང་རུང་གི་ཐོག་ལུ་ ཟོམ་རྒྱབ་ནི། • གཞན་ཀྱིས་བྱེས་ཡོད་པའི་ སྐྱན་ཟོམ་ཚུ་ལྷག་ཞིན་ན་ དེ་ ལུ་གཞི་བཞག་སྟེ་ ཟོམ་འབྲི་འབད་ནི།	༡༥

			• དཔེ་རྒྱན་དང་ གཟུགས་ཅན་ ཟུང་ལྡན་གྱི་རྒྱན་གདམ་ འཐུ་འབདཔ་ཡོད་མི་ཚུ་གི་ཐོག་ལུ་དཔེར་བརྗོད་རྒྱབ་ ཚུགས། • རྟ་བའི་ཆོག་རེ་རེ་བཞིན་གྱི་ གོ་དོན་ཆོག་འགྲེལ་རྒྱབ་ནི། • ཆོས་སྐད་དང་རྗོངཔའི་ མཚུངས་གསལ་གྱི་སྒྲ་ཚུ་ ལག་ལེན་འཐབ་ནི།	
• གདམ་འཐུ་འབདཔ་ཡོད་པའི་ དོན་ཚན་ཚུ་གི་ཐོག་ལུ་ མིང་གི་རྣམ་གྲངས་ གསུམ་ལས་མ་ཚུདམ་རེ་ དེས་ཆོག་བཅས་ འབྲི་སྒྲབ་འབདཝ་ཚུགས། • སྟན་རྩོམ་ནང་ལུ་ མདོན་བརྗོད་ཚུ་ལག་ལེན་འཐབ་སྟེ་ འབྲི་སྒྲབ་འབདཝ་ཚུགས། • མིང་ཚུ་གི་ རྒྱབ་ཁྱངས་དང་ སྡུད་ཚུ་ འབྲི་སྒྲབ་འབདཝ་ ཚུགས། • སྟན་རྩོམ་རྒྱབ་པའི་སྐབས་ལུ་ མིང་གི་རྣམ་གྲངས་ཚུ་ འོས་ འཐབ་ལྷན་ཏོག་ཏོ་འབད་ ཐེ་ཚུགས། • མདོན་བརྗོད་སྒྲིབ་སྤྱོངདང་འབྲེལ་ཏེ་ ཆོས་སྐད་དང་རྗོངཔའི་ མིངཔ་གི་ཐ་སྙད་མ་འདྲཝ་ཚུ་གི་ ཡོན་ཏན་གྱི་གཞི་འགྱམ་ འཐོབ་ཚུགས།	མདོན་བརྗོད།	• སྐ་གཞིའི་མིང་། • གདས་རིའི་མིང་། • ཪོ་བྱང་སྤྱིའི་མིང་ • ཁང་པའི་མིང་། • ནགས་ཚལ་གྱི་མིང་། • སྐྱེད་ཚལ་གྱི་མིང་། • ཤིང་སྤྱིའི་མིང་། • མི་སྤྱིའི་མིང་ • རྒྱལ་ཪོ་སྤྱིའི་མིང་། • བཙུན་མོ་སྤྱིའི་མིང་། • བྱོན་ཪོའི་མིང་། • བྱ་དཔོན་སོགས་ཀྱི་མིང་། • ཕ་མའི་མིང་། • ལུས་ཀྱི་ཡན་ལག་སོགས་ཀྱི་མིང་། • གསེར་དངུལ་སོགས་རིན་ཪོ་ཆེའི་མིང་། • མདའ་གཞུའི་མིང་། • འབྲུག་རྒྱལ་ཁབ་ཀྱི་མིང་།	• སྐབས་སྟེང་ མི་དང་འབྲེལ་བའི་མིང་། རིན་ཪོ་ཆེའི་མིང་ཚུ་གི་སྒོར་ལས་ མིངཔ་གི་རྣམ་གྲངས་ གསུམ་ལས་མ་ཚུདམ་རེ་ བཤད་པ་དང་སྦྱགས་ འབྲི་སྒྲབ་འབད་ཚུགས་དགོ། • སྟན་རྩོམ་ནང་ལུ་ མདོན་བརྗོད་ཚུ་ལག་ལེན་འཐབ་སྟེ་ འབྲི་སྒྲབ་འབད་ཚུགས་དགོ། • མདོན་བརྗོད་ལག་ལེན་འཐབ་སྟེ་ཡོད་པའི་ རྩོམ་ཚུ་གི་ གོ་དོན་ལེན་ཚུགས་དགོ། • མིངམ་འདྲཝ་ཚུ་ལུ་དཔྱད་རེ་ མིངཔ་ཁྱགས་ཐངས་ཀྱི་ དབྱེ་བ་མ་འདྲཝ་ཚུ་ ཞུན་པར་ཕྱེ་ཚུགས་དགོ། • མདོན་བརྗོད་སྒྲིབ་སྤྱོངདང་འབྲེལ་ཏེ་ ཆོས་སྐད་དང་རྗོངཔའི་ མིངཔ་གི་ཐ་སྙད་མ་འདྲཝ་ཚུ་གི་ ཡོན་ཏན་ཀྱི་ གཞི་འགྱམ་འཐོབ་ཚུགས་དགོ།	९०

3. ENGLISH

Subject: ENGLISH **Class: XI**

STRAND	CHAPTER	SCOPE		Weighting
		TOPICS / SUB-TOPICS	LEARNING OBJECTIVES	
Reading (Reading & Literature)	Essay	African Noel (Mark Patinkin)	1. Use the reading strategies developed in earlier classes. 2. Analyse how authors achieve their effects by the use of linguistic, structural and presentational devices – points of view, figurative language, flashback, parallel argument, symbols and image patterns - and use this information to help make meaning with the text. 3. Build vocabulary and practise pronunciation skills.	25%
		English Zindabad Versus Angrezi Hatao- (Kushwant Singh)	1. Use the reading strategies developed in earlier classes. 2. Analyse how author achieve his effects by the use of linguistic, structural and presentational devices. 3. Build vocabulary and practise pronunciation skills. 4. Assess their own values in the light of what they encounter in the literature they study to enrich their personal, cultural, and national beliefs.	
	Short Story	Leaving – M.G Vassanji	1. Use the reading strategies developed in earlier classes. 2. Build vocabulary and practise pronunciation skills. 3. Come to a new understanding of the human condition through their readings – the notions of spirituality, love, understanding, impermanence, tolerance and patriotism.	
		Jamaican Fragment (A.L Hendricks)	1. Use the reading strategies developed in earlier classes. 2. Build vocabulary and practise pronunciation skills. 3. Come to a new understanding of the human condition through their readings – the notions of spirituality, love, understanding, impermanence, tolerance and patriotism.	

			4. Assess their own values in the light of what they encounter in the literature they study to enrich their personal, cultural, and national beliefs.	25%
		The Open Window (Saki)	1. Use the reading strategies developed in earlier classes. 2. Build vocabulary and practise pronunciation skills. 3. Analyse how author achieve his effects by the use of linguistic, structural and presentational devices.	
	Poetry	Sonnet 18 (William Shakespeare)	1. Use the reading strategies developed in earlier classes. 2. Analyse how author achieve his effects by the use of linguistic, structural and presentational devices. 3. Come to a new understanding of the human condition through their readings – the notions of spirituality, love, understanding, impermanence, tolerance and patriotism. 4. Assess their own values in the light of what they encounter in the literature they study to enrich their personal, cultural and national beliefs.	25%
		My Last Duchess (Robert Browning)	1. Identify and analyse the range of issues encountered in a variety of texts. 2. Come to a new understanding of the human condition through their readings – the notions of spirituality, love, understanding, impermanence, tolerance and patriotism. 3. Build their vocabulary and practise pronunciation skills.	
		Where the mind is Without Fear (Rabindranath Tagore)	1. Identify and analyse the range of issues encountered in a variety of texts. 2. Build their vocabulary and practise pronunciation skills. 3. Come to a new understanding of the human condition through their readings – the notions of spirituality, love, understanding, impermanence, tolerance and patriotism.	

		The River Merchant's Wife: A Letter (Ezra Pound)	1. Identify and analyse the range of issues encountered in a variety of texts. 2. Build their vocabulary and practise pronunciation skills. 3. Come to a new understanding of the human condition through their readings – the notions of spirituality, love, understanding, impermanence, tolerance and patriotism. 4. Analyse how author achieve his effects by the use of linguistic, structural and presentational devices.	
	Drama	The Merchant of Venice (William Shakespeare) **Act 1 & Act 2**	1. Analyse how authors achieve their effects by the use of linguistic, structural and presentational devices – points of view, figurative language, flashback, parallel argument, symbols and image patterns - and use this information to help make meaning with the text. 2. Come to a new understanding of the human condition through their readings – the notions of spirituality, love, understanding, impermanence, tolerance and patriotism. 3. Assess their own values in the light of what they encounter in the literature they study to enrich their personal, cultural and national beliefs. 4. Talk and write about Bhutanese writers as well as major classical and modern writers and their works. 5. Build their vocabulary and practise pronunciation skills.	25%
Writing	Writing	1. Persuasive essay 2. Short story writing	1. Write a persuasive essay in which they show understanding and control of the elements of the different essay forms. 2. Recognise and apply in their writing, the features of persuasive essay. 3. Write a short story in which they show control of the elements of the short story form. 4. Demonstrate that they can make fine distinctions in grammar and diction to achieve precision in their writing. 5. Respond in writing to examination questions and homework assignments at an acceptable level. 6. Explore personal, cultural and national beliefs in their writing.	60%

Language & Grammar	Nature of Language	• Etymology • purposes that language • Characteristic features of language • Two theories of language acquisition [Rationalist and Behaviourist theory]	1. Discuss the purposes of language. 2. Discuss the origin of words (etymology) and how they become part of the language or how they become obsolete. 3. Know and discuss the common theories of language acquisition and development, for example, language is innate versus language is acquired.	10%
Language & Grammar	Grammar	• Transitive and Intransitive verb. • Literal and figurative language. • Use of discourse markers • Use of modal verbs • Phrasal verbs • Direct and Indirect speech • Conjunction coordinators and correlatives	1. Use the knowledge of grammar learned in earlier classes. 2. Know and use transitive and intransitive verbs appropriately. 3. Use literal and figuratively language appropriately.	30%
Listening & Speaking		• Book talk. • Debate. • Prepared Speeches.	• Use the listening and speaking skills developed in earlier classes. • Speak using correct question tag. • Talk about major classical and modern writers and their works including Bhutanese writers.	20%(CA)

		• Extempore speeches. • Interviews. • Panel discussion. • Group discussion.	• Deliver speeches incorporating literary quotations, allusions and imagery. • Speak with clear pronunciation. • Organise and participate in a panel discussion. • Use public speaking skills such as convention of address, methods of introduction of topic or theme, timing, pace, tone, intonation, gestures and closure to speak effectively in different contexts.	

Subject: ENGLISH **Class: XII**

STRAND	CHAPTER	SCOPE		Weighting
		TOPICS / SUB-TOPICS	**LEARNING OBJECTIVES**	
Reading (Reading & Literature)	Essay	What I Have Lived For (Bertrand Russell)	1. Assess their own values in the light of what they encounter in the literature they study. 2. Build their vocabulary and practise pronunciation skills.	25%
		Informing Ourselves to Death (Neil Postman)	1. Assess their own values in the light of what they encounter in the literature they study. 2. Build their vocabulary and practise pronunciation skills. 3. Identify and analyse the range of issues encountered in a variety of texts.	
	Short Story	The Elephant (Slawomir Mrozek)	1. Assess their own values in the light of what they encounter in the literature they study. 2. Understand the aspects of the human condition encountered in their readings – the notion of the impact of modern technology, real love, impermanence and aging, self-knowledge and language and culture. 3. Evaluate alternative opinions of the texts they read, using information from other texts and sources where appropriate.	
		Mirror Image (Lena Coakley)	1. Assess their own values in the light of what they encounter in the literature they study. 2. Understand the aspects of the human condition encountered in their readings – the notion of the impact of modern technology, real love, impermanence and aging, self-knowledge and language and culture.	

		Lamb to the Slaughter (Roald Dahl)	1. Assess their own values in the light of what they encounter in the literature they study. 2. Identify and analyse the range of issues encountered in a variety of texts. 3. Understand the aspects of the human condition encountered in their readings – the notion of the impact of modern technology, real love, impermanence and aging, self-knowledge and language and culture. 4. Build their vocabulary and practise pronunciation skills.	25%
	Poetry	Sonnet 60 (William Shakespeare)	5. Identify and analyse the range of issues encountered in a variety of texts. 6. Demonstrate a heightened sense of beauty and harmony.	
		The King Speaks to the Scribe (Keki Daruwalla)	4. Identify and analyse the range of issues encountered in a variety of texts. 5. Demonstrate a heightened sense of beauty and harmony. 6. Build their vocabulary and practise pronunciation skills.	25%
	Drama	The Merchant of Venice (William Shakespeare) - All V Acts	6. Understand the aspects of the human condition encountered in their readings – the notion of the impact of modern technology, real love, impermanence and aging, self-knowledge and language and culture. 7. Demonstrate a heightened sense of beauty and harmony.	25%
Writing	Writing	1. Argumentative essay 2. Short Story	1. Recognise and apply in their writing, the features of short stories and argumentative essays. 2. Demonstrate that they can make fine distinctions in grammar and diction to achieve precision in their writing. 3. Respond in writing to examination questions and homework assignments at an acceptable level. 4. Explore personal, cultural and national values in their writing.	60%

Language and Grammar	Nature of Language	1. Purposes of language 2. Function and characteristic features of human language 3. Three levels of language study 4. two theories of language acquisition	4. Know and discuss some of the characteristic features of human language, for example, that it is diverse and has common features such as fixed word order and grammar; that it reflects the culture of people who use it; that it is a means of communication, and is a way to express creativity. 5. Know and distinguish archaic words, derogative, slang and obsolete language and know when to use them appropriately. 6. Discuss the purposes of language.	10%
	Grammar	1. Phrasal verbs, 2. Compound and complex sentences with subordination and coordinating conjunctions. Conditional clauses 3. Direct and Indirect speech 4. Sentence conversions	1. Demonstrate a sound knowledge of the grammar that has been taught from earlier classes. 2. Know some of the characteristic features of human language, for example, that it is diverse and has common features such as fixed word order and grammar; that it reflects the culture of people who use it; that it is a means of communication, and is a way to express creativity.	30%
Listening & Speaking		1. Book talk 2. Debate 3. Discussions 4. Prepared Speeches 5. Extempore speeches 6. Role plays 7. Reading aloud	1. Use the listening and speaking skills developed in earlier classes. 2. Speak using correct question tag. 3. Talk about major classical and modern writers and their works including Bhutanese writers. 4. Use negotiation skills to resolve diplomatically conflicts that arise among members of groups. 5. Deliver speeches incorporating literary quotations, allusions and imagery. 6. Speak with clear pronunciation.	

4. ACCOUNTANCY

Subject: Accountancy **Class: XI**

Strand	Chapter	Scope		Weighting %
		Topics/Sub-topics	**Learning objectives**	
FINACIAL ACCOUNTING	Introduction to Accounting	1. Definition of Accounting 2. Features of Accounting 3. Objectives of Accounting 4. Branches of Accounting 5. Accounting Process 6. Golden Rules of Accounting 7. Users of Accounting Information	a) Define Accounting b) Explain features and objectives of Accounting. c) State the rules of Accounting. d) List the users of Accounting Information.	8
	Accounting Theory	1. Underlying Assumptions in Preparing Financial Statements a. Separate Business Entity b. Going Concern c. Money Measurement 2. Accounting Conventions a. Accounting Period b. Accruals and Matching c. Historical Cost 3. Fundamental Qualitative Characteristics a. Relevance b. Materiality c. Faithful Representation 4. Elements of Financial Statements 5. Development of Accounting Standards in Bhutan	a) Explain underlying assumptions and conventions in preparing Financial Statements. b) Discuss Qualitative features of Financial Statements. c) Explain elements of Financial Statements d) State the needs for Bhutanese Accounting Standards.	12
	Accounting Equation	1. Meaning 2. Effects of Transactions on Assets, Liabilities and Capital (Simple Equations/Transactions)	a) Explain Accounting Equation. b) Identify accounts involved in a transaction and show the effects in accounting equation.	8

	Journal	1. Source Documents 2. Vouchers 3. Meaning of Journal 4. Journal Entries	a) Explain the importance of source documents in accounting b) Prepare vouchers c) Explain the rules of debit and credit based on traditional and modern approaches. d) Journalise the transactions	15
	Ledger and Trial Balance	1. Meaning of Ledger and Trial Balance 2. Posting of Journal Entries into Ledger 3. Balancing of Accounts 4. Steps for preparing Trial Balance	a) Explain the purpose of Ledger and Trial Balance b) Apply rules of double entry system to prepare Ledger Accounts. c) Prepare Trial Balance.	10
	Accounting for Property, Plant and Equipment	1. Definition and Meaning of PP&E 2. Recognition and Measurement of PP&E 3. Definition and Meaning of Depreciation 4. Factors involved in calculating depreciation expenses 5. Recognition of Depreciation 6. Need for Providing Depreciation 7. Methods of Allocating Depreciation a. Straight Line Method 8. Carrying Amount	a) Explain the meaning, recognition criteria and measurement of PP&E. b) Explain the reasons for depreciation. c) Calculate depreciation amount by using Straight Line Method.	15
	Financial Statements	1. Meaning and Definition of Financial Statements 2. Capital and Revenue Items 3. Types of Financial Statements (Exclude Statement of Cash Flow)	a) Define Financial Statement. b) Distinguish between capital and revenue expenditures. c) Prepare a set of Financial Statements including Income Statement, Statement of Financial Position, Statement of Changes in Equity and Notes.	20
COST ACCOUNTING	Stores Ledger	1. Concept of Inventory 2. Meaning of Stores Ledger 3. Documents used in Stores Procedure 4. System of Inventory Verification 5. Methods of Inventory Valuation a. First in First Out	a) Explain the meaning of Inventory and Stores Ledger. b) Differentiate Periodic from Perpetual System of Stock Verification. c) Prepare store ledger using First-In-First-Out Method of stock valuation.	12
	Total			**100**

Subject: ACCOUNTANCY **Class: XII**

Strand	Chapter	Scope		Weighting
		Topics/Sub-topics	**Learning objectives**	
Financial Accounting	Accounting for Taxation	1. Accounting for current Tax 2. Accounting Income & Taxable income 3. BIT a) Source documents for BIT b) Allowable deductions; i. Direct cost ii. Employment expenses iii. Salary and Wages iv. Benefits • Accommodation • Gas Electricity & water • Conveyance /Transport • Telephone v. Bonus vi. Contributions to PF and GF	a) Explain the importance of taxation in business. b) Discuss the statutory responsibilities of managers for tax accounting in business. c) Differentiate between accounting profit and taxable profi t d) Explain the concept of current tax expense and tax liabili ties including under or over provision of taxes. e) Identify the source documents for BIT. f) Identify deductions not permissible under the Income Ta x Act of Kingdom of Bhutan. g) Compute Business Income Tax (BIT). h) Report tax components in the financial statements of the reporting entity.	10
	Accounting for Investment Property	1. Concept and definition 2. Recognition 3. Measurement a) Cost Model 4. Disposal of Investment property	a) Explain the concept of investment property. b) Explain the recognition and measurement basis for invest ment property. c) Discuss issues in classification of investment properties. d) Record accounting transactions related to investment prope rty. e) Present investment property in financial statements.	10
	Accounting for Intangible Assets	1. Concepts of Intangible Assets 2. Goodwill vs Intangible assets 3. Acquisition of Intangible assets 4. Recognition & Measurement 5. Derecognition of intangible assets	a) Explain the concept of intangible asset. b) Differentiate intangible assets from goodwill. c) Discuss the capitalization criteria for an item of intan gible asset. d) Record and report intangible asset in financial statem ents. e) Record and report for impairment and amortization of intangible assets.	10

	Provisions and Contingencies (complete)	1. Concepts of Liabilities, Provisions and Contingences 2. Recognition, measurement and disclosures of Liabilities, Provisions and Contingences	a) Explain the concept of liabilities and its recognition criteria. b) Explain the concept of provision and needs to create a provision . c) Calculate and record provision in financial statement. d) Explain the concept of contingent liability and contingent asset. e) Differentiate amongst liability, provision and contingent liability f) Identify disclosure requirement of contingencies in financial statements.	10
	Accounting for Equity Shares and Debt Finance	1. Concept of Equity Shares 2. Issue of Equity Shares 3. Components of Equity 4. Accounting for Equity Shares 5. Over Subscription of Equity Shares 6. Accounting for Dividends 7. Issue of Bonds a) Accounting for bonds issued at face value	a) Explain the concept of equity capital and the characteristics of equity shares. b) Differentiate between equity shares and preference shares. c) Explain the concept of debt finance and the characteristics of debt securities. d) Differentiate between equity and debt securities. e) Discuss the advantages and disadvantages of debt finance. f) Record equity and debt capital transactions, and report them in the financial statements.	10
	Accounting for Partnership	1. Partnership Accounting 2. Partners' Capital account 3. Partners' drawings Account 4. Profit and Loss Appropriation Account	a) Explain the meaning of partnership business and partnership agreement. b) Allocate salary, profit/loss, intrerest on drawing and interest on capital in the appropriation account. c) Prepare statement of partner's capital	10
	Financial Statements of a Limited Company	1. Statement of Cash Flow- Indirect method	a) Prepare cash flow statement using indirect method b) Intrepret the result of Cash Flows Statement.	10

Cost Accounting	Cost Sheet	1. Cost concepts 2. Cost Unit 3. Cost centre 4. Classification of cost 5. Cost Sheet 6. Treatment of Inventory	a) Explain the meaning of cost and cost accounting. b) State the objectives of cost accounting. c) Classify the elements of cost- material cost, labour cost and overheads. d) Prepare cost sheet. e) Draw relationship between cost sheet and financial accounting.	10
Management Accounting	Budget	1. Budgeting 2. Types of Budget 3. Cash Budget (cost of goods sold, budgeted income statement)	a) Explain the meaning of budgeting and master budget. b) Prepare cash budget. c) Identify ethical issues in budgeting.	10
	Financial Statement Analysis and Interpretation	1. Need and purpose of Financial Statement analysis 2. Financial Statement Analysis Tools a) Trend Analysis i. Basic calculation in trend analysis ii. Common size analysis b) Ratio Analysis c) Constructing financial ratios d) Types of Accounting ratios A. Profitability ratio i. Return on Capital Employed ii. Return on sales iii. Gross Profit B. Liquidity Ratio iv. Current Ration v. Asset Test Ratio	a) Explain the need to analyse and interpret financial statements. b) Perform basic financial statement analysis using trend and ratio analysis. c) Calculate accounting ratios with basic interpretations of these ratios. d) Discuss the limitations of accounting ratios. e) Perform basic common size analysis of income statement, financial position and cash flows.	10
	Total			**100**

Subject: Accountancy (Old curriculum) **Class: XII**

Strand	Chapter	Scope		Weighting %
		Topics/Sub-topics	**Learning objectives**	
Unit I	JOINT VENTURE	1. Meaning of joint venture 2. Objectives of Joint Venture 3. Recording Joint Venture Transactions in Separate Set of Books	a) Explain the meaning of Joint Venture b) Differentiate Joint Venture from Partnership c) Prepare Joint Venture Account based on Joint Bank Method.	15
Unit II	PARTNERSHIP ACCOUNTS-I FUNDAMENTALS OF PARTNERSHIP	4. Meaning of Partnership 5. Rules applicable in the absence of Partnership Deed 6. Meaning of Profit and Loss Appropriation Account 7. Preparation of Profit and Loss Appropriation Account 8. Partner's Capital Account a) Fixed b) Fluctuating	e) Explain the meaning of Partnership f) State the rules applicable in absence of Partnership Deed g) Prepare P/L Appropriation Account, Partner's Capital and Current Account	20
Unit III	JOINT STOCK COMPANY ACCOUNTS - ISSUE OF SHARES	1. Meaning of Joint Stock Company 2. Issue of shares at Par, Premium and Discount	c) Explain the meaning of Joint Stock Company d) Apply accounting treatment for issue of shares at par, premium and discount.	12
	JOINT STOCK COMPANY -ISSUE OF DEBENTURES	1. Meaning of Debenture 2. Issue and redemption of debentures at par. 3. Issue of debenture at premium, redeemable at par	e) Explain the meaning of Debentures. f) Pass the journal entries for issue of debentures at par, discount and premium. g) Pass the journal entries for Redemption of debentures at par and premium.	8

		4. Issue of debenture at discount, redeemable at premium		
	FINAL ACCOUNTS OF COMPANIES	1. Preparation of Company's Balance Sheet as per the companies Act of Kingdom of Bhutan, 2000 (without adjustment)	a) Prepare Balance Sheet as per the companies Act of Kingdom of Bhutan, 2000.	10
Unit IV	FINANCIAL STATEMENT ANALYSIS	1. Meaning of Comparative Financial Statement a) Comparative Balance Sheet b) Common Size Balance Sheet	d) Explain the meaning of Comparative Financial Statement e) Prepare comparative balance sheet and common size balance sheet.	10
Unit V	CASH FLOW STATEMENT	1. Meaning of Cash & Cash Equivalents, and Cash Flow Statement 2. Preparation of Cash Flow Statement without adjustments (Indirect method)	a) Explain the meaning of Cash & Cash Equivalents, and Cash Flow Statement b) Prepare Cash Flow Statement.	15
Unit VI	RATIO ANALYSIS	1. Meaning of ratio and types of ratios 2. Meaning of Ratio Analysis 3. Classification of Accounting Ratios	d) Explain the meaning of Ratio Analysis e) List the types of Ratios f) Calculate Accounting Ratios.	10
	Total			**100**

5. COMMERCE

Subject: COMMERCE **Class: XI**

Strand	Chapter	Scope		Weighting %
		Topics/Sub-topics	**Learning objectives**	
Unit I	Nature and Purpose of Business	1) Definition, objectives and concept of business 2) Classification of business activities	a. Explain the concept of business. b. State the objectives of business. c. Provide the classification of business activities.	18
Unit II	Forms of Business Organisations	1) Sole trader- Meaning and characteristics 2) Partnership- Meaning and features 3) Joint-stock company: meaning, characteristics, merits and demerits. 4) Type of companies	a. Explain the forms of business organization: Sole Proprietorship, Partnership and Joint Stock Company. b. Explain the types of companies.	22
Unit III	Stock Exchange	1) Meaning and importance 2) Functions of Royal Securities Exchange of Bhutan Limited (RSEBL)	a. Explain the meaning and importance of stock exchange. b. List the functions of RSEBL.	8
Unit IV	Inland Trade	1) Meaning 2) Channel of distribution: direct and indirect 3) Wholesale trade: Meaning and characteristics 4) Retail trade: Meaning and characteristics 5) Chambers of Commerce and Industry: Importance and Roles	a. Explain inland trade. b. Differentiate direct from indirect channel of distribution. c. Explain the meaning and characteristics of wholesale and retail trade. d. Explain the importance and roles of Chambers of Commerce and Industry.	22
Unit V	Foreign Trade	1) Meaning and Characteristics of international trade 2) Import & Export: objectives and purpose	a. Explain foreign trade. b. Examine the characteristics of foreign trade. c. Explain the objectives of Import and Export.	14
Unit VI	Warehousing	1) Meaning, objectives and necessity of warehousing 2) Functions of warehousing	a. Explain the meaning, objectives and necessity of warehousing. b. Discuss the functions of warehousing.	8
Unit VII	Insurance	1) Objectives and Purpose 2) Types of Insurance: fire, motor and life insurance	a. Explain the objectives and purpose of insurance. b. Discuss the types of Insurance: fire, motor and life insurance.	8
	Total			**100**

Subject: COMMERCE **Class: XII**

Strand	Chapter	Scope		Weighting %
		Topics/Sub-topics	**Learning objectives**	
Unit I	1) Corporate Organisation	1) Joint Stock Company: meaning and importance.	a) Explain the meaning and importance of Joint Stock Company.	23
	2) Formation of a company	1) Formation of a Company as per the provisions of the Companies Act of the Kingdom of Bhutan. a) Promotion, meaning and role of promoters. b) Incorporation of Company ✓ Filing of documents and registration as per the Companies Act of the Kingdom of Bhutan. ✓ Certificate of Incorporation. c) Raising of capital ✓ Prospectus-its nature and importance, statement in lieu of prospectus. ✓ Minimum subscription d) Commencement of business.	a) Explain the steps/procedures involved in formation of a Joint Stock Company. b) List the documents required for incorporation of a company.	
Unit II	Management Personnel	1) Board of Directors: Numbers of Directors, Functions of BOD, Qualification of Directors, Vacation/Disqualification of Directors as per the Companies Act of the Kingdom of Bhutan 2) Appointment of Directors	1) Explain the functions of Board of Directors. 2) State the qualification of Directors, and Vacation/Disqualification of Directors as per the Companies Act of the Kingdom of Bhutan. 3) Explain the method of appointing directors of a Company	10
Unit III	Financing	1) Meaning and importance of business finance 2) Capital for sole trader, partnership and joint stock company 3) Sources of capital for Joint Stock Company; based on ownership period, and purpose	1) Explain the concepts of capital and its importance to business. 2) Identify different sources of finance for business organisations.	20

		4) Types of shares: equity and preference; advantages and disadvantages 5) Retained earning 6) Debt capital; loan, debentures-different types of debentures.		
Unit IV	Management	1) Management: Meaning, and objectives 2) Function of Management: planning, organising, staffing, directing and controlling	1) Examine the objectives, concepts and functions of management.	15
Unit V	Communication	1) Meaning and objectives 2) Communication barrier and elimination 3) Principles of communication	1) Explain the meaning and objectives of communication. 2) Identify the different barriers and suggest ways to overcome it. 3) Suggest various principles of effective communication.	10
VI	Marketing	1) Meaning, concept and objectives 2) Marketing functions 3) Advertising: meaning, objectives and functions 4) Sales promotion: Meaning and objectives 5) Salesmanship: meaning and objectives 6) Qualities of a good salesman	1) Explain the concept of marketing and its functions. 2) Explain advertisement and its functions. 3) Explain sales promotion and its objectives. 4) Explain salesmanship and identify qualities of salesmanship.	22
			Total	**100**

6. Agriculture and Food Security

Subject: Agriculture and Food Security **Class XI**

Chapter	Scope		Weighting (%)
	Topic/Sub-topic	**Learning Objective**	
1. Introduction to Sustainable Agriculture	1. What is sustainable development? 2. Sustainable agriculture system a. Good for families and communities b. Good for sound environment c. Economically sustainable 3. Practices of sustainable agriculture a. Threat to agriculture sustainability 4. Food and nutritional security a. Food security b. Impact of food insecurity 5. Food and nutritional security status in Bhutan 7. GNH and sustainable development a) 8. Sustainability concerns in Bhutanese agriculture	• Explain sustainable agriculture system. • State the factors that threaten sustainable agriculture system. • Explain food security and impacts of food insecurity. • List down the sustainability concerns associated with the Bhutanese agriculture system. • Explain the correlation between sustainable development and sustainable agriculture system • State the food and nutritional security status in Bhutan	7
2. Basics of Soil and Water Management	1. Soil a. Properties of soil 2. Nutrient management a. Source of plant nutrients b. Integrated nutrient management(INM) System 3. Irrigation and water management a. Irrigation b. Crop water requirement c. Methods of irrigation 4. Soil and water conservation practices a. Nutrient management b. Soil management 5. Management of soil and water conservation a. Physical soil and water conservation measures	• Describe the basic properties of soil • Explain integrated nutrient management system and mention its benefits. • Define irrigation and explain different methods of irrigation. • Describe the significance of soil and water conservation practices • Explain physical, biological and agronomical conservation measures of soil and water	7

	b. Biological soil and water conservation measures c. Agronomic soil and water conservation measures		
3. Growing of Food Crops	1. Crop classification 2. Food crops of Bhutan a. Rice b. Maize c. Wheat d. Oil crops 3. Production practices of rice a. Growing conditions b. Choice of variety c. Nursery preparation d. Rice establishment e. Irrigation management f. Harvesting 4. Production practices of maize a. Varieties b. Land preparation c. Manure and fertilizers d. Method and time of application e. Crop establishment f. Plant protection against insect pest and diseases	• Classify food crops as per the AEZ, cropping system and the cropping pattern of food crops. • Describe harvesting technologies and handling practices of produce. • Explain the production practices of rice and maize.	**10**
4. Food Processing, Value Addition and Preservation	1. Food preservation a. Factors affecting food deterioration 2. Methods of food preservation a. Physical methods b. Chemical preservation methods c. Biochemical methods (fermentation) d. Hurdle technology 3. Enhancing food preservation by indirect approach	• Explain food preservation • Describe the factors that affect the food deterioration • Explain the methods of food preservation • Describe the strategies for enhancing food preservation	**7**

	a. Packaging b. Production of value added products c. Food quality and safety		
5. Starting a Fish Farm	1. Pisciculture or fish culture a. Fish in human health b. Characters of cultivable fish c. Cultivable fish species in Bhutan 2. Procedures of fish farming a. Pre-stocking management practice b. Stocking management practice 3. Post-harvest technology a. Autolysis or self-digestion b. Bacterial decomposition c. Chemical changes d. Handling of fish	• Explain fish culture • State the importance of fish in human diet and its business opportunity • Identify major species of carp cultured in Bhutan. • List down the procedures of fish farming • Explain the post-harvest technology in enhancing the fish business sustainability • State the factors that trigger the spoilage of fish after harvest and ways to prevent from spoilage.	**8**
6. Starting a Goat Farm	1. Goat breeds and breeding a. Breeds for milk production b. Goat breeds for meat production c. Dual purpose goats 2. Goat breeding and reproduction a. Breeding strategy b. Age of puberty and mating c. Signs of heat or estrus d. Mating e. Procedures for breeding and management of goats 3. Housing of goat a. Floor space b. Hygienic feeding c. Management of raising kids d. Castration and disbudding e. Sustainable management f. Disease, prevention and control	• Explain why goats are referred as ‘poor man’s cow’ or ‘Swiss baby’s foster mother’ • Explain the procedure involved in goat breeding • Describe the factors that affect the reproductive rate of goats • Explain the housing requirements of goat rearing • Discuss the importance of record keeping, culling and control of flock size/ population	**9**

	4. Record keeping, culling and control of flock size or population		
7. Pasture Development and Management	1. Improved pasture and fodder species a. Fodder seed production b. Pasture management c. Pasture renovation d. Fodder conservation 2. Fodder tree plantation	• Identify the improved pasture and fodder species • Explain pasture management practices • Describe pasture renovation and fodder conservation • Explain why fodder tree plantation is important in livestock farming	**5**
8. Climate Change and its Impact on Agriculture Sector	1. Climate and its links with agriculture, forest and water resources 2. Climate and climate change in Bhutan 3. Climate trend and projection a. Temperature trend change b. Rainfall pattern change c. Community observation on climate parameters d. Climate projection 4. Climate risk and vulnerability a. Agriculture and its vulnerabilities to climate change b. Forest and its vulnerabilities to climate change c. Water and its vulnerabilities to climate change d. Human health and its vulnerabilities to climate change 5. Climate change and adaptation policies, plan and actions policy and legal framework a. Individual contribution in reducing GHG and other pollutants	• Explain climate change and its causes • Explain the trends of climate change and its impact on agriculture, forest, water and human health • Describe the risk and vulnerability of climate change on agriculture, forests, water and health. • Outline adaptation policy, plans and action of the RGoB to mitigate the climate change	**8**
9. Agriculture Research and Development	1. Need for research a. Types of research b. Agriculture research in Bhutan	• Explain the importance of research • State different types of research	**4**

	2. Innovation approaches of sustaining agriculture 3. Innovation systems, social learning and participatory action research a. Social learning theory b. Participatory action research c. RNR research in Bhutan	• Explain the purpose of agriculture research in Bhutan. • Describe innovation systems, social learning and participatory action research designs.	

Scope			Weighting (%)
Chapter	**Topic/Sub-topic**	**Learning Objective**	
1. Good Practices in Sustainable Agriculture	1. Sustainable agriculture 2. Agro-ecological system 3. Drivers of change in Bhutanese agriculture: a) A good practice for gaining food security and sovereignty b) Biodiversity c) Water availability and competition d) Land degradation e) Policy f) Adaptation in socio-ecological systems	• Explain the principles of agro-ecological system • Describe sustainable agriculture in challenging the drivers of change in Bhutanese agriculture • Describe adaptation policies and plans of the government in ensuring sustainable land management • State how advocacy on socio-ecological system can sustain Bhutanese agriculture	**5**
2. Horticulture	1. Horticulture 2. Importance of horticulture 3. Horticulture industry in Bhutan 4. Protected cultivation for sustainable horticulture a) For hot climate b) For wet and humid climate c) For cool climate d) Planning of protected structures e) Climate regulation equipment and management f) Planning, designing and construction of naturally ventilated poly-house g) Planning, designing and construction of shade net house. h) Horticulture development strategy of the MoAF	• Explain horticulture and its importance • Explain Bhutan's agro-ecological zones suitable for horticulture industry • Design suitable poly-house for different kinds of horticulture practices based on different climatic conditions • State the strategies adopted by MoAF for horticulture development	**6**

3. Organic Farming	1. Organic agriculture: a) Benefits of organic farming b) Features of organic agriculture c) Principles of organic farming 2. Effective micro-organisms technology (EM) a) How EM technology works b) Application of EM c) Compost making using EM 3. Organic approaches of managing pest, disease and weeds a) Botanical pesticides preparations on farm b) Seeds 4. Converting farm to organic b) Strategy for conversion c) Maintenance of an organic farm d) Marketing scope for organic produce e) Challenges and opportunities f) Support for organic farming	• Explain the concept of organic agriculture, principles, features, and benefits • Explain the working modality of EM technology and its applications in agriculture and compost making • Describe the practice of organic approaches to managing pests, diseases and weeds • List down the strategies, opportunities, and challenges of converting farm into organic	**8**
4. Plant and Animal Breeding	1. Principles of plant and animal breeding a) Animal breeding b) Plant introduction 2. Crop breeding in Bhutan a) Release of new crop varieties b) Distribution and maintenance of new varieties c) Molecular breeding and marker-associated selection d) Genetic engineering and GM crops	• Explain the principles of plants breeding and their needs in the agriculture farm • Explain different methods in of plant breeding according to their reproductive system and genetic engineering • Explain the types of in-breeding systems and out-breeding systems	**6**
5. Dairy Farming	1. Dairy farming a) Tasks involved in dairy farming b) Cattle breeds 2. Breeding system in dairy cattle	• Explain the importance of dairy cattle and their breeds in Bhutan • Explain dairy farm management • Describe the features of sheds	**9**

	a) In breeding b) Out breeding 3. Dairy farm management a) Proper housing and other facilities b) Good feeding practices c) Clean milk production d) Basic conditions for clean milk e) Farm animal herd improvement is necessary for improved milk production f) Preventive animal health care g) Disposal of unproductive animals. h) Disposal of farm waste	• State the importance of good feeding practices	
6. Seed Production and Marketing	a) Seed a) Importance of seed b) Seed development c) Seed and seed system b) Seed and plant propagation methods c) Production procedures of seeds and planting methods a) Vegetables b) Cereals c) Oilseeds d) Legumes and pulses e) Fruit plants d) Seed quality test a) Moisture content b) Physical purity c) Seed processing	• Describe seed and seed system • Explain seed production procedures of vegetables, cereals, oilseeds, legumes and pulses and fruit plants • Describe the procedure to conduct seed quality test • Discuss the importance of seeds, seed production and the opportunities for entrepreneurship	**9**
7. Mushroom Production and Management	1. Mushroom 2. Mushroom cultivation 3. Mushroom cultivation in Bhutan a) Mushroom cultivation on wood logs	• Discuss planning, designing and construction of different ways of mushroom cultivation • Describe the requirements for mushroom cultivation	**6**

	b) Construction of mushroom shed and cultivation of mushrooms c) Mushroom cultivation on straw 4. Disease management of mushroom cultivation a) Disease fungi b) Competitor fungi c) Weed fungi d) Post-harvest fungi e) Insects and other pests	• Discuss the measures to manage diseases in mushroom cultivation	
8. Farm Mechanization in Bhutan	1. Farm mechanization a) Farm operation b) Mechanization in land preparation c) Mechanization of seeding and transplanting d) Mechanization of weed e) Mechanization in harvesting f) Mechanization of threshing g) Mechanization of post-harvest operation	• Explain the adoption of appropriate farm mechanization as alternative solution to resolve drudgery in the Bhutanese farm • State the advantages of farm mechanization	**7**
9. Agro-meteorology	1. Meteorology a) Agro-meteorology b) The hydrological cycle c) The climate system d) Climatology 2. Factors affecting weather and climate a) Latitude b) Altitude c) Precipitation d) Nearness to large water bodies e) Topography f) Vegetation 3. Clouds a) Cloud formation	• Explain meteorology based on water cycle • Differentiate between weather and climate • List down the factors affecting weather and climate • Explain the importance of remote sensing in sustainable agriculture practices	**9**

	b) Basic types of clouds c) Precipitation d) Process of rain formation 4. Importance of rainfall on crop plants a) Weather forecasting b) Remote sensing Agro-meteorology in Bhutan		

7. BIOLOGY

Subject: BIOLOGY **Class XI**

Chapter	Scope		Weighting (%)
	Topic/Sub-topic	**Learning Objective**	
1. Biomolecules	1.1. Carbohydrates A. Monosaccharides classification based on the number of carbons with some examples, and their chemical properties B. Oligosaccharides (disaccharides with sucrose as an example) C. Polysaccharides 1. Storage polysaccharides, starch, glycogen and cellulose (details of structure not required) 2. Mucopolysaccharides (definition with one example)	• Describe the molecular structure of glucose as an example of monosaccharide • Describe the formation of glycosidic bonds in the condensation reactions of two glucose molecules to form maltose; and formation of sucrose (a non-reducing sugar) from the glucose and fructose. • Describe the breaking down of glycosidic bonds in disaccharides and polysaccharides by hydrolysis. • Explain polysaccharides giving starch, cellulose, glycogen and mucilage as examples; and the functions of these polysaccharides.	**4**
	1.2. Lipids A. Simple lipids (oils and waxes) B. Compound /Conjugated lipids (phospholipids**)** C. Derived lipids (cholesterol)	• Explain the composition of various classes of lipids (simple lipids: oils, fats, compound lipids, phospholipids, derived lipids, and cholesterol) • Describe the importance of cholesterol in living organisms and health problems related to it in human beings.	
	1.3. Proteins A. Amino acids 1. Composition, essential and non-essential amino acids 2. Peptide bond and properties of amino acids (functions of amino acids not required) B. Level of protein organization - Primary, secondary, tertiary and quaternary structures (details of the types of bonds not required)	• Name some common amino acids • List some essential and non-essential amino acids. • Describe the formation of peptide bonds to form dipeptides, polypeptides and proteins (polymers). • Describe the primary, secondary, tertiary and quaternary structure of proteins.	

	1.4. Nucleic acids A. Nucleotides B. Composition, formation of nucleoside and nucleotides, functions of nucleotides, and ATP as energy currency. (molecular structure of nucleotides not required) C. Deoxyribonucleic acid (types, polarity, base pairing, antiparallel direction, sense and antisense chains, non-coding and repetitive DNA, denaturation and denaturation, and Watson and Crick's model) D. Ribonucleic acid (structure and types of RNA)	• Describe the basic structure of a nucleotide based on pentose sugar, a nitrogen containing base and a phosphate group. • Classify the bases in DNA and RNA as purines (guanine or adenine) or pyrimidines (cytosine, thymine and uracil). • Explain the structures of DNA and RNA (mRNA, rRNA, and tRNA)	
2. Enzymes	2.1. Enzyme	• Explain that enzymes are globular proteins which catalyse metabolic reactions	**3**
	2.2. Importance of Enzyme	• Outline the importance of enzymes	
	2.3. Characteristics of enzymes A. Intracellular and extracellular enzymes B. Chemical Nature of Enzymes 1. Simple enzymes 2. Conjugated enzymes (apoenzymes, prosthetic group, cofactors, and coenzymes)	• Describe various types of enzymes based on the site of action and chemical nature	
	2.4. General properties of enzymes	• Describe the properties of enzymes	
	2.5. Nomenclature of enzymes A. On the basis of substrate acted upon by the enzyme (protease, lipase, sucrase, urease, Nuclease and maltase) B. On the basis of types of reaction catalysed (dehydrogenase, isomerase, oxidase and reductase)	• Explain the nomenclature of enzymes based on substrate acted upon, types of reaction catalyzed, substrate acted upon and catalytic activity, and substance synthesized from their catalytic activity.	

	C. On the basis of substrate acted upon and the type of reaction catalyzed (DNA polymerase and L-glutamic dehydrogenase) D. On the basis of substance synthesized		
	2.6. Mode of enzyme action A. Active site for enzyme action B. Formation of enzyme substrate complex 1. Lock and Key hypothesis 2. Induced fit hypothesis C. Lowering of activation energy	• Analyse and explain the mode of action of enzymes in terms of active site, formation of an enzyme-substrate complex and lowering of activation energy. • Explain lock and key hypothesis and induce fit hypothesis of enzyme's working modality	
	2.7. Factors affecting enzymatic activity (temperature, hydrogen ion concentration, substrate concentration, product concentration, enzyme concentration, enzyme-substrate complex, and activators)	• Explain how enzyme activity is affected by various variables	
	2.8.Inhibition of enzymatic action (competitive inhibition and non-competitive inhibition,)	• Outline the effects of reversible inhibitors (both competitive and non-competitive) on the rate of enzyme activity.	
3. Respiratory System	3.1. External and internal respiration	• Outline the events of external and internal respiration for the gas-exchange mechanism in multicellular organisms	**3**
	3.2. Human respiratory system A. Respiratory tracts (all the parts) B. Lungs 1. External structure of lungs 2. Internal structure of lungs C. External features of respiratory membranes of alveoli	• Describe the structure of the respiratory tract and gas exchange system (alveoli, bronchioles, bronchi, trachea and lungs) • Describe the essential features of the alveoli and explain their role in gas exchange.	
	3.3. Mechanism of pulmonary respiration A. Breathing or Pulmonary ventilation 1. Organs of pulmonary ventilation 2. Inspiration 3. Expiration	• Describe the mechanism of ventilation. • Outline how gases are transported. • Explain how acid hem globin acts as a buffer. • Describe how Haldane's effect release carbon dioxide from haemoglobin.	

	4. Pulmonary volumes 5. Pulmonary capacities B. Exchange of gases 1. Pulmonary exchange of gases 2. Gaseous exchange in tissues C. Transport of respiratory gases 1. Transport of oxygen 2. Transport of carbondioxde D. Acid hemoglobin and buffer E. Release of carbon dioxide in alveoli F. Haldane effect		
	3.4.Regulation of breathing or ventilation A. Nervous control and chemical control	• Describe how breathing is regulated by nervous and chemical control.	
4. Transport System	4.1. Circulatory system (functions of circulatory system)	• Explain the functions of the circulatory system	**4**
	4.2. Types of circulatory system (open circulatory system, closed circulatory system, single and double circulation)	• Compare the various types of circulatory systems/circulations.	
	4.3.Human Circulatory system A. Heart 1. External structure of heart 2. Internal structure of heart 3. Beating of the heart 4. Cardiac cycle 5. Heart rate and pulse rate B. Heart beat 1. Types of heart beat 2. Coordination or heartbeat. 3. Cardiac cycle 4. Origin and conduction of heartbeat, 5. Regulation of heartbeat. C. Circulation of blood 1. Double circulation.	• Describe the structure of the mammalian heart, (atria and ventricles, valves and great blood vessels). • Outline the steps of cardiac cycle. • Outline the pathway of cardiac impulse from SAN till Purkinje fibre. • Explain double circulation and coronary circulation. • State the normal systolic and diastolic arterial blood pressure.	

	2. Coronary circulation 3. Arterial blood pressure (measurement of blood pressure, regulation of blood pressure, oedema)		
	4.4. Blood coagulation A. Mechanism of blood coagulation. B. Role of vitamin K in blood clotting. C. Natural anticoagulants, thrombosis. D. Defibrinated blood)	• Describe the process of blood coagulation. • Write the role of vitamin K.	
	4.5. Blood group and blood transfusion A. ABO blood grouping and Clumping reaction. B. Blood transfusion and basics of blood transfusion. C. Rh factors and Rh incompatibility during pregnancy	• Explain blood compatibility based on ABO blood grouping and Rh blood grouping.	
	4.6 Lymphatic system A. Lymph and functions of lymph	• Describe the role of lymph • List the organs and structures that form the lymphatic system.	
	4.7. Relationship among blood, tissue fluid, lymph and plasma	• Deduce the relationship among blood, tissue fluid, lymph and plasma.	
5. Homeostasis	5.1. Homeostasis (definition)	• Explain the principles of homeostasis in terms of receptors, effectors and negative feedback.	**3**
	5.2. Principal of Homeostasis (receptor/sensor, integrator or control center and effector)		
	5.3. Feedback control in homeostasis A. Negative feedback B. Positive feedback	• Describe and compare the types of feedback control in homeostasis.	
	5.4. Examples of homeostatic Mechanisms A. Thermoregulation (what happens when body temperature begins to rise and what happens in a cold day?) B. Regulation of glucose concentration in blood (Hormones secreted by pancreas,	• Explain the importance of homeostasis in mammals; for example, the maintenance of a constant core temperature. • Explain the mechanism of regulation of glucose concentration in blood.	

	mechanism of regulation of blood glucose level, role of insulin hormone, role of liver in regulation of blood glucose) and regulation of water and electrolytes balance in blood by kidneys	• Outline how kidneys regulated water and electrolyte balance in the blood.	
6. Chemical Coordination	6.1. Types of glands in human body (exocrine gland, endocrine gland and heterocrine gland)	• Describe the structural and functional differences between the three types of glands**.**	**3**
	6.2. Hormones (definition)	-	
	6.3 Human endocrine system A. Hypothalamus 1. Hormones secreted by hypothalamus B. Pituitary Gland 1. Anterior pituitary lobe (hormones, functions and disorder) 2. Intermediate lobe (hormones and functions) 3. Posterior lobe (hormones of posterior lobe) C. Thyroid gland (hormones secreted by thyroid gland, functions of thyroid gland and disorder of thyroid gland) D. Adrenal glands 1. Adrenal cortex (hormones and disorders) 2. Adrenal medulla (hormones) E. Testis (hormones and disorders and male hypogonadism and precocity) F. Ovaries (hormones, female hypogonadism and precocity)	• Name the endocrine glands and the hormones they secrete. • Describe the disorders associated with the endocrine glands on the growth and development of human being.	
7. Nervous Coordination	7.1. Functions of nervous system (Nerves and types of nerves)	• Explain the role of the nervous system in control and coordination in the human body.	**4**
	7.2.Working of nervous system	• Explain how the nervous system performs interconnected functions.	
	7.3. Eye as an example of sensory organ A. Gross structure of human eye	• Draw and describe the gross structure of the mammalian eye as an example of a sensory organ.	

	(details of human eye, rod and cone cells, and cavities of eyeball) B. Working of human eye (power of accommodation and interpretation of visual impulses)	• Explain the power of accommodation adjusted by human eyes and the interpretation of impulses by brain.	
8. Brain and Behaviour	8.1. Central Nervous system A. Human Brain-Brain matter (gray matter and white matter) B. Meninges (piamater, arachnoid mater, duramater, spaces between the meninges, and cerebrospinal fluid) C. Gross structure of brain 1. Fore brain, its components and functions 2. Mid brain, its components and functions 3. Hind brain, tis components and functions 4. Ventricles of Brain 5. Limbic system D. Spinal cord (morphology, internal structure and functions)	• Draw and describe the gross structure of the mammalian brain. • Identify the location and explain the functions of the cerebrum, hypothalamus, cerebellum and medulla oblongata. • Draw and describe the gross structure of the spinal cord.	**3**
	8.2. Peripheral nervous system A. Cranial nerves B. Spinal nerves (origin and exit and distribution of spinal nerves) C. Nerve terminations	• Compare the cranial and spinal nerves.	
	8.3. Autonomic nervous system A. Sympathetic nervous system and functions of sympathetic nervous system B. Parasympathetic nervous system and functions of parasympathetic nervous system	• Differentiate between sympathetic and parasympathetic nervous system.	
9. Immune System	9.1. Body's defence mechanism	-	**3**
	9.2. Immunity, immune response and immune system	• Define the term immune response.	

	9.3. Types of immunity A. Non-specific/innate/inborn immunity (external defence, internal defence) B. Specific/acquired/adaptive immunity 1. Components (antibody mediated immune system and cell mediated immune system) 2. Cells of immune system (APCs and lymphocytes)	• Explain the roles of the body's primary defences against pathogens. • Describe the structure and mode of action of phagocytes. • Describe cell-mediated immunity involving the production of T lymphocytes and antibody-mediated immunity, involving the production of B lymphocytes. • Explain the role of memory cells in long-term immunity.	
	9.4. Primary and Secondary immune response	• Compare and contrast the primary and secondary immune responses.	
	9.5. Antigens and antibodies (antigens, antibodies and antibody action)	• Define the terms antigen and antibody.	
	9.6. Active and Passive Immunity	• Describe active and passive immunity	
	9.7.Vaccination and Immunisation A. Types of vaccines B. Classification of vaccines	• Explain the disease control by vaccination.	
	9.8.Disorders of immune system A. Allergies (allergens, symptoms, expression of allergic reaction and examples)	• Explain the mechanism of allergic reactions.	
10. Transport System in Plants	10.1. Transport of water, food and minerals	• List the mechanisms of transport system in plants.	**3**
	10.2. Movement of water and other substances A. Imbibitions (definition and factors affecting imbibition) B. Diffusion (simple diffusion, diffusion pressure and factors influencing diffusion) C. Facilitated diffusion D. Active transport E. Co-transport	• Explain imbibition, diffusions, active transport, and co-transport. • Describe how the rate of imbibition and diffusion is affected by the variables.	
	10.3. Osmosis (mechanism of osmosis)	• Explain the mechanism of osmosis**.**	

	10.4. Osmotic pressure A. Osmotic pressure (measurement of osmotic pressure and osmotic pressure in some plants) B. Reverse osmosis C. Turgor pressure or hydrostatic pressure and wall pressure D. Diffusion pressure deficit (relationship among OP, TP, WP and DPD	• Outline various pressures measured in plants due to osmosis. • State how OP, TP, WP and DPD are related to each other depending on the condition of the cell.	
	10.5. Potential energy and Chemical Potential A. Chemical potential or water potential	• Describe water potential and its role in water absorption	
	10.6.Water absorption A. Soil Water (types of soil water) B. Water absorbing system in plants. C. Pathways of water movement in roots (apoplast and aymplast pathway).	• List the types of soil water. • Describe the way in which water is moved through the plant from root hairs to stomata, including the apoplast, symplast and vacuolar pathways.	
	10.7. Ascent of sap (theories of ascent of sap) A. Physical force theory 1. Cohesion-Tension and transpirational pull theory (transpiration and cohesion of water molecules in xylem) 2. Evidences in support of the theory	• Explain the cohesion-tension theory in moving water through the xylem with evidences to support it.	
	10.8. Transpiration A. Structure of stomatal apparatus. B. Mechanism of stomatal transpiration C. Mechanism of stomatal movement 1. Malate or potassium ion pump hypothesis 2. Factors affecting opening and closing of stomata.	• Explain the mechanism of stomatal transpiration. • Describe the effects of external and internal factors on the rate of transpiration. • Outline how the stomatal movement is regulated by malate or potassium ions.	
	10.9. Phloem transport A. Main features of phloem transport. B. Ring experiment to demonstrate path of translocation of food.	• Relate mass flow hypothesis as a mechanism of transport in phloem, involving active loading at the source (e.g. leaves) and removal at sinks (e.g. roots).	

	C. Munch mass flow or pressure flow hypothesis. D. Experiment to demonstrate mass flow hypothesis	• List down the experiments do demonstrate the translocation of food.	
11. Control System in Plants	11.1. Plant growth regulators A. Growth promoters and growth inhibitors 1. Auxins (types of auxins and functions) 2. Giberellins (functions) 3. Cytokinins (functions) 4. Ethylene (functions) 5. Abscisic acid (effects of ABA) B. Interactions amongst the growth regulators	• Outline the need for plants to respond to changes in the internal and external environment. • Explain how plants' responses to environmental changes are co-ordinated by hormones. • Describe the role of auxins, giberrelins, cytokinins, ethylene and ABA.	**3**
	11.2. Apical dominance, senescence and abscission A. Apical dominance B. Abscission	• Outline the mechanism of apical dominance and abscission in plants.	
	11.3. Plant movements A. Types of plant movement 1. Autonomic of spontaneous movement 2. Paratonic or induced movements: tropic movement and nastic movements (just definition)	• Describe the types of plant movements (autonomic and paratonic) with examples	
	11.4. Photomorphogenesis A. Photoreceptors in plants 1. Phytochromes 2. Cryptochromes	• Explain the role of phytochrome in flowering and cryptochrome in seed germination • Describe how phytochrome is involved in seed germination.	
	11.5. Phytochromes in seed germination (explanation for the role of phytochromes in seed germination		
	11.6. Photoperiodism and flowering A. Effect of photoperiod or photoperiodism on flowering B. Photoperiodic classification of plants C. Photoperiodic responses	• Describe the effects of photoperiodism on flowering process. • Classify the plants based on the photoperiodism. • Explain the photoperiodic response, critical dark period, and photoperiodic induction.	

	(Photoperiodic response, critical dark period and photoperiodic induction and chemical basis of photoperiodic response)		
	11.7. Vernalisation (practical utility)	• Explain the practical utilities of vernalisation	
12. The Cell Cycle	12.1Structure of chromosome A. Prokaryotic chromosome B. Eukaryotic chromosome (nucleosome and nucleosome packaging)	• Explain that in eukaryotes, DNA is linear and associated with proteins and in prokaryotes, DNA molecules are smaller, circular and are not associated with proteins.	**3**
	12.2. Morphology of metaphase or anaphase chromosome A. Primary Constriction and centromere B. Secondary constriction and nucleolar organizer region (NOR) C. Tertiary constriction D. Telomeres E. Satellite F. Chromatids	• Explain the morphology of metaphase or anaphase chromosome. • Differentiate between primary, secondary, and tertiary constriction. • Describe telomere, satellite, and chromatids.	
	12.3. Cell Cycle A. Phases of cell cycle 1. Interphase or I phase (G_1 phase, S-phase and G_2 phase) 2. Mitotic phase or M phase. 3. G_0 phase	• Outline the events of cell cycle and their significance.	
	12.4. Cell division A. Mechanism of mitosis 1. Karyokinesis (prophase, metaphase, anaphase and telophaase) 2. Cytokinesis (cytokinesis in plant cell and animal cell) B. Significances of mitosis	• Describe the behaviour of chromosomes during the main stages of the mitotic cell cycle (prophase, metaphase, anaphase and telophase), and the associated behaviour of the nuclear envelope, cell membrane and centrioles. • Explain the role of mitosis in growth, repair and asexual reproduction in animals and plants.	
13. Asexual Reproduction	13.1. Reproduction	• Explain how animals reproduce by means of fission, binary fission, budding and regeneration	**3**
	13.2. Asexual Reproduction		

	13.3. Asexual reproduction in animals A. Fission (definition and examples of binary fission and multiple fission) B. Budding (Definition and examples) C. Regeneration		
	13.4. Vegetative propagation in plants A. Methods of natural vegetative propagation 1. Vegetative propagation by roots. 2. Vegetative propagation by stems (sub-aerial stems, underground stems and aerial stems not required) 3. Vegetative propagation by leaf buds. 4. Vegetative propagation by flower buds B. Methods of artificial vegetative propagation to obtain artificial clones of plants 1. Cutting 2. Grafting 3. Layering C. Advantages of vegetative propagation D. Disadvantages of vegetative propagation	• Explain how plants reproduce by means of natural propagation. • Discuss the advantages and disadvantages of vegetative propagation • List artificial methods of vegetative propagation.	
	13.5. Plant cloning A. Plant Tissue culture (just the technique of plant tissue culture) B. Disadvantage of plant cloning	• Describe the production of artificial clones of plants from tissue culture. • Explain the disadvantages of plant cloning.	
14. Inheritance	14.1 A. Just the contribution of Mendel and the reason that attributes him as father of genetics. B. Genetic terminology	• Explain the terms gene, allele, locus, phenotype, genotype, dominant, recessive and codominant.	**3**
	14.2. Monohybrid cross A. Experiment and observation 1. F_1 generation. 2. F_2 generation	• Use genetic diagrams to solve problems involving monohybrid and dihybrid crosses, including those involving sex linkage, codominance and multiple alleles (illustrated by the ABO blood-group system).	

	3. F_3 generation B. Mendel's explanation and interpretation on: 1. Tall and dwarf 2. Alleles 3. Law of dominance and recessive 4. Law of segregation		
	14.3. Dihybrid cross A. Experiment and observation B. Explanation C. Probability of F_2 genotypes and phenotypes of a dihybrid cross D. Law of independent assortment		
	14.4. Biological importance of Mendelism	• Explain the practical applications of Mendelism.	
	14.5. Deviation of Mendelism (Explain the following topics with any one example) A. Incomplete dominance or blending inheritance B. Co-dominance	• Explain how incomplete dominance and co-dominance deviate from Mendel's laws.	
	14.6. Sex linkage or sex linked inheritance (sex limited and sex influenced characters not required) A. Sex linked inheritance in *Drosophila* B. Crisscross inheritance (significance not required)	• Use genetic diagrams to demonstrate the crisscross inheritance.	
	14.7.Chi square Test A. Chance deviation evaluation of genetic data (chi square test, chance deviation and null hypothesis) B. Formula for calculating chi-square value C. Procedure to calculate chi-square value(hypothetical monohybrid cross and hypothetical dihybrid cross)	• Use the chi square test to test the significance of the difference between observed and expected results.	

15. Gene Cloning	15.1. Basics of gene Cloning (Just teach the concept of gene cloning)		**3**
	15.2. Recombinant DNA Technique	• Outline the steps of recombinant DNA technique.	
	15.3. Tools of Gene cloning A. Enzyme 1. Lysing Enzymes 2. Cleaving enzyme (exonuclease, endonuclease and restriction endonuclease) 3. Synthesis enzymes (DNA polymerase, reverse transcriptase, ligase and alkaline phosphatase) B. Characteristics of restriction endonuclease. C. Cloning vectors	• Explain the roles of the tools of gene cloning. • State what are cloning vectors.	
	15.4. Procedure of recombinant DNA technique A. Isolation of genetic materials B. Separation of isolated DNA fragments C. Cutting segments of isolated DNA at specific locations by restriction endonuclease D. Synthesis of cDNA E. Formation of cDNA library F. Insertion and ligation of DNA segments into vector and formation of recombinant DNA G. Introduction of recombinant DNA into host cells H. Selection of transformed host cells I. Producing clones of transformed cells carrying recombinant DNA J. Culturing transformed cells for obtaining foreign gene product	• Describe how fragments of DNA is produced by conversion of mRNA to cDNA using reverse transcriptase. • Describe cloning of genes by *in vivo* techniques using restriction endonucleases and ligases to insert DNA fragments into vectors, which are then transferred into host, rapidly-reproducing microorganisms.	
	15.5. Gene amplification by PCR	• Describe the use of the polymerase chain reaction (PCR) in producing multiple copies of DNA fragments.	

16. Genetic Engineering	16.1. Genetic engineering (types of transgenic organisms not required)	• Explain the concept of genetic engineering in the formation of GMOs.	**3**
	16.2. Application of Genetic Engineering A. Increased growth of livestock and fish B. Increased and improved wool production in sheep. C. Molecular farming D. For detecting cancer	• List the practical applications of genetic engineering.	
	16.3. Genetically modified Plants A. Objectives of developing GM crops. B. Criticism against GM plants	• Outline the objectives and criticisms pertaining to GM plants	
	16.4. Genetically modified organisms in medicine A. Therapeutic drugs or pharmaceutical B. Molecular diagnosis C. Genetic engineering and pollution control.	• Discuss the potential of genetically modified organisms in agriculture, medicine, and pollution control	
	16.5. Recombinant DNA-Ethical and social issues A. Social issues B. Bioethics& moral issues	• Evaluate the ethical, moral and social issues associated with the use of recombinant DNA technology.	
17. Origin and Diversity Of Life	17.1. Diversity of life	• Explain the diversity of life and need for biological classification	**3**
	17.2. Origin of diversity		
	17.3. Biological classification A. Need for biological classification (Systems of biological classification and Relationship between classification and phylogeny are not required)		
	17.4. Taxonomical Hierarchy Taxonomic Category (Species, Genus, Family, Order, Class, Phylum, Kingdom and Domain)	• Describe the classification of species based on the hierarchy of: Kingdom, Phylum, Class, Order, Family, Genus and Species. • Explain the term species.	
	17.5. Binomial nomenclature (Rules of binomial nomenclature)	• Explain the rules and significance of naming organisms by the system of binomial nomenclature.	

	17.6. Three domains of life (Domain Archaea, Domain Bacteria and Domain Eukarya)	• Outline the features of the three domains of life.	
	17.7. Five kingdom system of classification (Kingdom Monera, Protista, Fungi, Plantae and Animalia)	• Outline the distinguishing features of the five Kingdoms: Prokaryotes, Protists, Fungi, Plants and Animals.	
18. Variations	18.1. Nature of variations 1. Variations at Individual level 2. Variations within population 3. Variations between populations. 4. Variations within a species	• Describe the four levels for variations.	**3**
	18.2. Continuous Variation A. Important features of continuous variations. B. Origin of continuous variations (crossing over and random fertilization)	• Explain the significance of continuous and discontinuous variation. • Distinguish continuous variation from discontinuous variation.	
	18.3. Discontinuous Variation A. Important features of discontinuous variations. B. Origin of discontinuous variations 1. Change in structure of genes (cause and types of gene mutations and nonsense, missense and same sense mutation) 2. Change in structure of chromosome (deficiency, inversion, duplication and translocation. 3. Change in number of chromosomes (euploidy and aneuploidy,) 4. Significance of aneuploidy, 5. Importance of polyploidy. 6. Role of polyploidy in speciation of plants.	• Describe the source of continuous and discontinuous variation. • Define polyploidy, euploidy and aneuploidy. • Outline the significance of aneuploidy and polyploidy.	
19. Ecosystem	19.1. Terms and concepts in ecology	• Define habitat, population and ecosystem, and energy flow in ecosystems.	**3**

	(Biosphere, Biomes, Ecosystem, Biotic components of ecosystem, Abiotic components of ecosystem and Dynamic of ecosystem)		
	19.2. Energy flow in Ecosystem A. Solar energy as the ultimate source of energy for ecosystem. B. Producers, consumers and decomposers 1. Decomposers. C. Tropic levels in ecosystem (first, second third, fourth, fifth and sixth tropic levels) D. Transfer of energy through ecosystems. E. Limited number of tropic levels.	• Explain that photosynthesis is the ultimate source of energy for an ecosystem. • Explain the term producer, consumer and trophic level. • Describe the transfer of energy through food chains and food webs. • Explain why energy is lost between trophic the levels.	
	19.3. Ecological pyramids (pyramid of number, pyramid of biomass and pyramid of energy and limitations of ecological pyramid)	• Describe the types of ecological pyramids and their significance. • Outline the limitations of the ecological pyramids.	
20. Ecosystem	20.1. Population	-	**3**
	20.2. Dynamics or attributes of population A. Population size B. Population density C. Age distribution (expanding population, stable population and declining population) D. Age pyramids (triangular, bell-shaped and urn-shaped) E. Growth rate and growth pattern (Sigmoid growth curve and J-shaped growth curve) F. Birth rate or natality G. Fertility rate H. Death Rate or mortality I. Biotic potential J. Population fluctuations K. Migration	• Describe how the growth rate and growth pattern are illustrated by sigmoid and J-shaped curve. • List the attributes of population dynamics. • Explain carrying capacity and population density. • Outline how population size is affected by natality, fertility rate, motality, biotic potential, and migration. • Describe predator-prey relationships and their possible effects on the population sizes of both the predator and the prey. • Describe inter-specific competition and intra-specific competition with an example each.	

	20.3. Environment and population density A. Abiotic factor B. Biotic factors (environmental resistance and regulation of population density) C. Carrying capacity of the environment Components of environmental carrying capacity (life supportive capacity and assimilative capacity)	• Outline how population density is regulated by the biotic and abiotic factors. • Explain the significance of limiting factors in determining the final size of a population.	
	20.4. Limiting factors in determining the size of population A. Density-independent factors. B. Density-dependent factors 1. Predation (defence mechanism in animals and defence mechanism in plants, Importance of predation and biological control of predation 2. Parasitism C. Competition (intraspecific competition, interspecific competition and cause hypothesis)		
21. Pollution	21.1. Pollution A. Pollutant 1. On the basis of persistence (primary pollutant and secondary pollutant) 2. On the basis of degradability (biodegradable and non-biodegradable) 3. On the basis of existence (qualitative pollutant and quantitative pollutant)	• Define indicator species and describe how such species can be used to monitor air or water pollution. • Describe the health implications of reduced water quality due to sewage disposal. • Assess the environmental issues arising from the use of fertilisers (leaching and eutrophication).	**2**
	21.2. Indicator species (examples and roles of indicator species)	• Name the indicator species and describe their role of being bio-indicators	
	21. 3. Climate change and Bhutan 1. Impacts of climate change in Bhutan. 2. Mitigation measures in Bhutan.	• Explain the implication of climate change in Bhutan.	

	3. Measures to control pollution in Bhutan 4. Control of air pollution in Bhutan. 5. Control of water pollution in Bhutan. 6. Solid waste management in Bhutan 7. School greening programme to create environmental awareness and pollution control	• Outline the control measures adopted by Bhutan in mitigating air pollution, water pollution, and waste management	

Subject: BIOLOGY **Class XII**

Chapter	Scope		Weighting (%)
	Topic/Sub-topic	**Learning Objective**	
1. Cell: The Unit of Life	1.1. Prokaryotic and eukaryotic cells A. Prokaryotic cell 1. Cell wall, 2. Capsule, 3. Plasma membrane, 4. Cytoplasm, 5. Nuclear material, 6. Plasmids/episomes, 7. Flagella, 8. Pilli/fimbriae B. Eukaryotic cell 1. Cell envelope 2. Cell wall (brief) 3. Cell membrane and its functions, cytoplasm and its function, C. Membrane bound organelles (structures, types and functions) 1. Endoplasmic reticulum, 2. Mitochondria, 3. Chloroplast, 4. Golgi complex, 5. Lysosomes, 6. Microbodies (only list of peroxisomes, glyoxysomes, spherosomes),. D. Non-membranous organelles (Structures, types and functions) 1. Ribosomes, 2. Centrioles, 3. Vacuoles E. Nucleus (structure and functions)	• Describe typical prokaryotic cells and eukaryotic cells as seen under the microscope. • Describe the structure of a prokaryotic cell to include the cell wall, plasma membrane and its invaginations, flagella, bacterial chromosomes, plasmids, glycogen granules and lipid droplets. • Describe the structures and functions of Golgi apparatus, mitochondria, rough and smooth endoplasmic reticulum, lysosomes, ribosomes, chloroplasts, plasma membrane, cellulose cell wall, nuclear envelope, centrioles, microtubules, nucleus, nucleolus and cilia. • Compare the structure of prokaryotic cells with eukaryotic cells. • Describe the structure and functions of various organelles. • Relate the components of a nucleus to its functions. • Identify the functions of various organelles in regulation of different biosynthetic processes in a cell.	**3**

	1. Nuclear envelope , 2. Nuclear matrix, 3. Nucleolus 4. Nuclear reticulum or chromatin		
2. Aggregation of Cells	2.1. Tissues (brief description)	-	**3**
	2.1.Plant tissues and their types A. Meristematic tissue 1. Characteristics 2. Structure of organization of apical meristem 3. Theories: Histogen theory, tunica corpus theory 4. Root apical meristem. B. Permanent tissues 1. Simple permanent tissue (parenchyma, collenchyma, and sclerenchyma) 2. Complex permanent tissue (xylem: components and functions; Phloem: components and functions)	• Identify varieties of tissues, their functions and locations. • Explain the organisation of meristemic tissues as explained by histogen theory and tunica corpus theory. • Explain the difference in the organisation of cells in root apex from that of shoot apex. • Classify plant tissues based on their structures. • Describe phloem and xylems as complex permanent tissues highlighting their components and functions.	
	2.3. Tissue system A. Epidermal tissue system 1. Epidermis and its functions 2. Cutin or cuticle and wax 3. stomata B. Ground tissue system (only definition) C. Vascular tissue system 1. Explanation with three components 2. Vascular bundles or vascular strands (conjoint, concentric, and radial).	• Describe the tissue systems giving different components • Describe the important roles of epidermal tissue system highlighting the important functions of epidermis, cutin and stomata. • Identify the differences in the arrangement of cells in the vascular bundles of roots, stems and leaves.	
	2.4. Animal tissues A. Epithelial tissue	• Explain the organisation of cells into tissues using squamous and ciliated epithelia as examples.	

	1. Simple (unilayered) epithelium: Squamous, cuboidal; columnar; ciliated epithelium (only basic features) 2. Compound or stratified epithelium: Squamous; cuboidal; ciliated; specialised (only basic features) B. Connective tissue 1. Connective tissue proper: Loose connective tissue (areolar tissue, adipose tissue, reticular tissue, their structure, location and functions); dense connective tissue (tendons and ligaments, dense irregular tissues, their location and functions) 2. Special connective tissue: Cartilages (types, their structures, locations and functions); Bones (structure of decalcified bone, Haversian system in mammalian bone) C. Muscle tissue 1. Skeletal or striated muscles 2. Smooth or unstriated muscles 3. cardiac muscles (locations and functions.) D. Nervous tissue (brief description)	• Explain the various forms of simple and compound epithelia emphasizing on their basic features. • Explain the various forms of loose connective tissue emphasizing on their basic features. • Describe bones and cartilages as special connective tissue, relate their structure to their roles in human. • Explain the structure of skeletal, smooth and cardiac muscles; identify their physical properties point out how they are able to function in human body. • Explain to show that nervous tissue is a special tissue.	
3. Support and Movement System	3.1. Movement A. Types of movement 1. Nonmuscular movements (only definitions of cytoplasmic streaming; amoeboid; ciliary; flagellar movements)	• Describe different types of movement exhibited by cytoplasm, cilia, flagella and muscles. • Explain to show some differences between muscular and non-muscular movements.	**4**

	2. Muscular movements (brief)		
	3.2. Muscle A. Skeletal muscle 1. Muscle bundles or fascicles; 2. Structure of a muscle fibre or muscle cell or myofilament • Ultrastructure of a myofibril • Structure of contractile muscle proteins • Mechanism of muscle contraction • Prerequisite for muscle contraction • Resting potential and action potential across sarcolemma • Electrical and biochemical events during muscle contraction 3. Energy for muscle contraction (Cori cycle, summation, threshold stimulus, all or none law, muscle fatigue and refractory period	• Explain the sliding filament model of muscular contraction. • Describe the roles of actin, myosin, calcium ions and ATP in muscular contraction. • State some structural differences between voluntary, involuntary and cardiac muscle. • Describe some processes and principals such as Cori cycle, threshold stimulus, summation, muscle fatigue, all or nor law, refractory period; associated to muscle functions.	
4. Human Digestive System	4.1. Human digestive system A. Alimentary canal 1. Mouth 2. Vestibule 3. Oral or buccal cavity (palate, tongue, teeth, their structure and functions) 4. Pharynx (parts and their functions) 5. Oesophagus; stomach (structure and function) 6. Small intestine (structure and functions) 7. Large intestine (structure and functions) B. Digestive Glands	• Describe using diagrams, the structure of the human digestive system (oesophagus, stomach, duodenum and ileum) and relate this to the function of these organs. • Describe the sites of production and actions of enzymes and bile in digestion.	**4**

	1. Salivary Glands and their functions 2. Gastric glands and their functions 3. Intestinal glands and their functions 4. Liver and its functions 5. Pancreas(exocrine part; endocrine part; their hormones) and its functions		
	4.1. Physiology of Digestion 1. Swallowing or Deglutition 2. Digestions (Mechanical and Chemical digestion) • Digestion in buccal cavity • Digestion in stomach (Digestion of proteins) • Digestion in small intestine (carbohydrates, proteins, fats, and nucleic acids) • Role of large intestine	• Describe the chemical and mechanical digestion in different parts of the digestive system; specifying the organs and reactions.	
	4.2. Absorption of digested food products A. Absorption in different parts of alimentary canal 1. Absorption in buccal cavity and oesophagus 2. Absorption in stomach 3. Absorption in intestine 4. Absorption in large intestine B. Mechanism of absorption 1. Absorption of carbohydrate, amino acid, fats, electrolytes vitamins, and water	• Describe the absorption of food specifying the substances absorbs in different parts of the alimentary canal. • Describe the mechanisms that enable the absorption of food (carbohydrate, amino acid, fats, electrolytes vitamins, and water), including the roles of diffusion, facilitated diffusion and active transport.	
5. Energy Systems	5.1. Cellular respiration A. Types of respiration 1. Aerobic respiration 2. Anaerobic respiration	• Distinguish aerobic respiration from an aerobic respiration.	**4**

	5.1. Aerobic respiration A. Glycolysis or EMP pathway B. Oxidation or oxidative decarboxylation of pyruvate to acetyl CoA C. Kreb's cycle or TCA 1. Steps of Kreb's cycle 2. Terminal oxidation D. Electron transport system and oxidative phosphorylation 1. Electron acceptors 2. Respiratory coenzyme complexes 3. Mobile electron carriers E. Oxidative phosphorylation	Describe aerobic respiration to show that: • Glycolysis takes place in the cytoplasm and involves the conversion of glucose to pyruvate with a net gain of ATP and reduced NAD. • Pyruvate combines with coenzyme A in the link reaction when oxygen is available in the mitochondrial matrix to produce acetyl-CoA. • Acetylcoenzyme A (2C) combines with oxaloacetate (4C) to form citrate (6C) which then enters the Krebs cycle. • Krebs cycle involves a series of oxidation-reduction reactions and the release of carbon dioxide, leading to the production of ATP and reduced coenzyme (NAD or FAD). • Explain electron transport system and oxidative phosphorylation.	
6. Nervous Coordination	6.1. Coordination	• Describe coordination as a fundamental process in controlling body processes.	**3**
	1.2.Nervous system A. Nerve fibres 1. Neurilemma 2. Myelin sheath B. Nerves 1. Sensory nerve 2. Motor nerve 3. Mixed nerves	• Explain the structure of nerve fibre giving the components with their functions. • Describe the structure and functions of sensory, motor and mixed nerves.	
	6.1. Generation and conduction of nerve impulse A. Resting membrane potential 1. Na^+-K^+ channels 2. Sodium-potassium exchange pump B. Transmission of nerve impulse 1. Generation of nerve impulse or generation of action potential 2. Conduction of nerve impulse	• Describe the establishment and maintenance of resting potential. • Explain the generation of an action potential. • Describe the transmission of an action potential in a myelinated neuron in terms of voltage-gated sodium ion channels. • Explain the importance of the refractory period in producing discrete nerve impulses.	

	3. Synaptic transmission of nerve impulse	• Describe the sequence of events involved in transmission across a synapse	
	6.2. Effects of drugs on synaptic transmission A. Effect of nicotine B. Effects of marijuana C. Effects of alcohol	• Explain the effects of drugs (e.g. nicotine, marijuana) on synaptic transmission.	
7. Excretion	7.1. Human Excretory system A. Kidneys 1. Structure of kidneys 2. Nephron 3. Blood vessels of kidneys B. Urine formation 1. Formation of urine (ultrafiltration; tubular or selective reabsorption and tubular secretion) 2. Mechanism of concentration of nephric filtrate 3. Hormonal regulation of urine volume 4. Micturition 5. Urine	• Describe using diagrams, the structure of the mammalian kidney and nephron. • Describe the processes involved in the formation of urine in the kidney, including ultrafiltration in the renal capsule and selective re-absorption in the proximal convoluted tubule. • Describe the role of nephron in the regulation of blood water content.	**4**
8. System in Plants: Roots, Stems and Leaves	8.1. Root system	• Describe some basic features and functions of root system.	**4**
	3.2.Anatomy of root A. Internal structure of dicot roots 1. Anatomical characteristics of dicot root B. Internal structure of monocot roots 1. Anatomical characteristics of monocot root	• Describe the structure of dicot and monocot roots; specifying epiblema, cortex, endodermis, pericycle, conjunctive tissue, pith, and vascular tissue. • Explain how a dicot root is different from monocot root.	

	3.3. Anatomy of stem A. Internal structure of dicot stem 1. Epidermis, cortex, pericycle, vascular bundles, medullary rays, and pith or medulla. B. Internal structure of monocot root 1. Epidermis, hypodermis, ground tissue, and vascular bundles.	• Describe the structure of the vascular tissues (xylem vessels and phloem tissue composed of sieve tube elements and companion cells) and how they are adapted to their functions.	
	3.4. Anatomy of Leaf A. Internal structure of a dorsiventral or dicot leaf B. Internal structure of isobilateral or monocot leaf	• Describe the structure of dicot and monocot leaves specifying upper epidermis, lower epidermis, mesophyll, and vascular bundles	
4. Energy System in Plants: Photosynthesis	9.1. Photosynthesis: An energy transfer process (general description)	• State that photosynthesis is a process in which light energy is used to produce complex organic molecules.	**4**
	4.2. Chloroplast A. Pigments involved in photosynthesis 1. Chlorophyll a 2. Carotenoids 3. Phycobillins B. Absorption of light by photosynthetic pigments 1. Absorption spectrum 2. Action spectrum C. Photosynthetic units or Light larvesting complexes 1. Reaction centre 2. Antenna molecules 3. Core molecules	• Explain the roles of chlorophyll a, carotenoids and phycobillins during light reaction. • State that the light-dependent stage takes place in thylakoid membranes and that the light independent stage takes place in the stroma.	
	4.3. Photosystems A. Photosystem I or PS I 1. Components B. Photosystem II or PS II	• Explain how PSI is different from PSII	

	1. Components		
	4.4. Mechanism of Photosynthesis A. Light reaction or Hill's reaction 1. Absorption of light 2. Excitation of reaction centres 3. Photosynthetic electron transport or formation of assimilatory energy 4. Photophosphorylation and ATP synthesis 5. Noncyclic and cyclic photophosphorylation B. Light-Independent reaction or biosynthetic phase 1. Calvin cycle or Calvin-Benson cycle (carboxylation, reduction and regeneration phases) 2. Hatch-Slack Pathway or C4 pathway (features of pathway and anatomy of C4 plants) C. Factors affecting photosynthesis (carbon dioxide, light, temperature and water)	• Explain that the steps of light reaction involves absorption of light, excitation of reaction centres, transport of electrons, phosphorylation. • Explain the two types of photophosphorylation pointing the path of electrons and wavelength of light. • Describe that in the light-independent reaction production of sugars occur. • Describe the effects of temperature, carbon dioxide concentration and light intensity on the rate of photosynthesis.	
5. Genetic Material, Genetic Code and Protein Synthesis	10.1. DNA replication A. Semi-conservative method of replication B. Process of replication of DNA C. Leading and Lagging strands of DNA 1. Leading strand synthesis 2. Lagging strand synthesis D. Editing or proofreading and DNA repairs E. Unidirectional and bidirectional DNA replication	• Outline the steps of semi-conservative mechanism of DNA replication, including the roles of DNA helicase and DNA polymerase. • Explain the rate of formation the two strands are different. • Describe how DNA acts as a genetic code by controlling the sequence of amino acids in a polypeptide.	**5**

	10.2. Transcription A. Transcription unit 1. Promoter region 2. Terminator region 3. Structural gene B. Split genes C. Mechanism or steps of transcription in prokaryotes D. RNA processing or post-transcriptional modification of RNA transcripts in eukaryotes (processing of mRNA primary transcript, tRNA transcript, and rRNA transcript)	• Describe the production of messenger RNA in transcription. • Describe the steps of transcription to show the roles of various enzymes; and the similarities and differences in the steps of replication and transcription. • Explain how RNAs are processed in post-transcriptional process.	
	10.3. Genetic code A. Triplet genetic code B. Codon C. Essential features of genetic code	• State that codons for amino acids are triplets of nucleotide bases. • Explain the features of genetic code. • Describe the universality of genetic code.	
	10.4. Translation A. Flow of genetic information B. Mechanism of translation (steps)	• Outline how the process of translation of mRNA to polypeptide chain. • Describe the roles of ribosomes, mRNA and its codons, and transfer RNA and its anticodons in translation.	
11. Sexual Reproduction: Meiosis	11.1. Meiosis or reduction division A. Meiosis I or first meiotic division 1. Prophase I (need to look at five stages) 2. Metaphase I 3. Anaphase I 4. Telophase I B. Interkinesis C. Meiosis II or second meiotic division 1. Prophase II 2. Metaphase II	• Describe the behaviour of chromosomes during meiosis, and the associated behaviour of the nuclear envelope, cell membrane and centrioles, • Explain meiosis I as a process that is related to reduction of chromosome numbers and source of genetic variation. • Relate meiosis to sexual reproduction,	**3**

	3. Anaphase II 4. Telophase II		
12. Sexual Reproduction in Human	12.1.Human reproductive organs A. Male reproductive system (structure and function of each part) B. Female reproductive system (structure and function of each part)	• Describe the structure and functions of the male and female reproductive system.	**4**
	12.2.Gametogenesis A. Spermatogenesis 1. Formation of spermatids 2. Formation of spermatozoa or sperm B. Spermatozoa (sperm) C. Oogenesis 1. Multiplication phase 2. Growth phase 3. Maturation phase D. Ovid or Ootid	• Describe the production of gametes in oogenesis and spermatogenesis. • Draw a labelled diagram and describe the structures of ovum and the sperm.	
	12.3. Menstrual Cycle A. Menstrual phase B. Follicular phase C. Ovulatory phase D. Luteal or Secretory phase E. Menarche and menopause	• Relate the events in the menstrual cycle to reproduction	
	12.4. Fertilisation A. Insemination B. Movement of sperm C. Arrival of ovum D. Capacitation of sperm E. Fusion of gametes F. Activation of egg G. Amphimixis or karyogamy	• Explain fertilisation as a process involving a series of steps and chemical reactions.	

	12.5. Implantation 12.6. Placenta	• Describe implantation and the functions of the placenta in relation to the development of the foetus.	
13. Sexual Reproduction in Flowering Plants	13.1.Events involved in sexual reproduction A. Pollination 1. Self-pollination 2. Cross-pollination - Significance of pollination B. Fertilisation 1. Germination of pollen grains on stigma 2. Passage of pollen tube through style 3. Entry of male gametes into the embryo sac (double fertilisation and triple fusion, and significance of double fertilisation) C. Post-fertilisation events 1. Formation and development of endosperm 2. Embryogeny (generic) 3. Formation of fruits	• Describe pollination and events leading to fertilisation • Describe the steps involved during fertilisation. • Describe double fertilisation and the structural changes which occur after fertilisation, leading to the development of the embryo within the seed, and the ovary into the fruit.	**3**
14. Recombinant DNA Technology and Genetic Manipulation	14.1. Gene therapy A. Mechanism of gene therapy 1. Genetic screening or genetic testing 2. DNA sequencing 3. Gene delivery B. Types of gene therapy 1. Somatic cell gene therapy 2. Germline gene therapy C. Ethical considerations	• Explain that in gene therapy, healthy genes may be cloned and used to replace defective genes. • Describe the process of gene therapy. • Differentiate somatic cell gene therapy from germ line cell gene therapy. • State some ethical considerations of gene therapy.	**4**

	14.2. Genetic Fingerprinting A. Principle B. Procedure C. Applications of genetic fingerprinting	• Outline the procedures of genetic fingerprinting. • Give some applications of genetic fingerprinting. • Describe the principle of genetic fingerprinting.	
15. Origin and Diversity of Life	15.1. Origin of life: biopoiesis A. Chemogeny or chemical origin of life (formation of simple and complex compounds) B. Biotic origin of life (origin of eobionts or protobionts and formation of early cells) C. Cognogeny (chemoheterotrophs, chemoautotrophs, photoautotrophs, effects of oxygen on evolution and evolution of eukaryotes)	• Explain chemogeny, biogeny and cognogeny as steps for origin of life. • Describe chemical reactions as important part in origin of life. • Explain the gradual changes leading to the development of cells from protobionts and how the formation of cells changed the environment.	**3**
	15.2. Diversity of life A. Interrelationship among organisms (similarities in structural organisation and life processes) B. Evidences in support of similarities in living organisms 1. Evidences from morphology (homology, analogy, vestigial organs, and atavism) 2. Evidences from connecting links (viruses, lung fishes, protherian mammals) 3. Evidences from embryology (similarity in early developmental of animals; and development of vertebrate organs. 4. Evidences from palaeontology or palaeobiology	• Explain that diverse forms of life are related using the similarities in their structure and life processes as examples. • Describe the common origin of life on a scientific basis with the examples form morphology, connecting links, embryology and fossils. • Describe some significance of palaeontology in studying evolution. • Describe that comparisons of DNA base sequences or of the proteins encoded by this DNA can be used to reveal relationships between organisms.	

	5. Evidences from biogeographical distribution 6. Evidences from cytology and genetics 7. Evidences from biochemistry and physiology C. Significance of study of fossils		
16. Evolution	16.1. Theories of evolution A. Lamarckism (postulates of Lamarckism) B. Darwinism (postulates of Darwinism) C. Mutation Theory (salient features, evidences, and objection of mutation theory) D. Neo-Darwinism or Modern synthetic theory of evolution (mutation, recombination, heredity, natural selection, and Isolation) E. Hardy-Weinberg principle	• Explain evolution based on Lamarckism, Darwinism, mutation theory, and neo-Darwinsim. • Explain Hardy-Weinberg principle. • Use the Hardy-Weinberg equation ($p^2 + 2pq + q^2 = 1$, where p is the frequency of the dominant allele and q is the frequency of the recessive allele) to calculate allele frequencies in populations.	**4**
	16.2. Factors affecting eene equilibrium in a population A. Genetic variations and their causes 1. Mutations (just the concept) 2. Mendelian recombination of genes 3. Gene flow (hybridisation and migration) Significance of genetic variability B. Reproductive isolation C. Genetic Drifts or Sewall Wright effect in small populations 1. Sampling error or bottleneck effect 2. Founder's effect or Founder's principle	• Explain why variation is essential factor in natural selection. • Describe mutation, recombination and gene flow as important factors in creation of genetic variation. • Explain the role of reproductive isolation in evolution. • Using founder's effect and bottleneck effect, explain that genetic drift is a major force in determining the nature and direction of evolution. • Describe the role of natural selection in evolution. • Outline the underlying idea of Lederberg's replica plating experiment from Lamarckian view and Darwinian view. • Explain artificial selection	

	D. Role of natural selection in large populations Differential reproduction Forms of natural selection 1. Directional selection (Industrial melanism) 2. Disruptive or diversifying selection 3. Stabilising selection E. Genetic basis of natural selection (Lederberg replica plating experiment) F. Artificial selection		
	16.3. Speciation or Origin of new species A. Allopatric speciation or parapatric speciation B. Sympatric speciation	• Explain the concept of a species in terms of production of fertile offspring • Explain the difference between sympatric speciation and allopatric speciation.	
17. Biodiversity and its Conservation	17.1.Concept of biodiversity A. Magnitude of biodiversity in Bhutan. B. Levels or components of biodiversity 1. Genetic diversity 2. Species diversity (species richness and species evenness) 3. Ecosystem Diversity. (alpha, beta and Gamma diversity) C. Measuring biodiversity 1. Simpson's index of diversity Significance of low and high diversity	• Describe the prevalence of biodiversity in Bhutan, citing examples of plants and animals. • Explain how biodiversity can be considered at different levels; genetic, species and ecosystem. • Calculate the biodiversity of a habitat using Simpson's Index of Diversity. • Discuss the significance of both high and low values of Simpson's Index of Diversity.	**3**
	17.2. Human activities and threat to biodiversity A. Habitat loss B. Introduction of exotic species C. Overharvesting and over exploitation D. Global changes	• Explain how human activities are a big threat to biodiversity, giving some prominent examples. • Describe global changes such as climate change can result in loss of biodiversity.	

	17.3. Conservation of biodiversity A. Economic reasons for conservation of Biodiversity B. Ecosystem services C. Ethical reasons D. Aesthetic reasons	• Outline economic, ecological, ethical and aesthetic reasons for conservation of biodiversity.	
	17.4. Conservation strategies A. In-situ conservation 1. National Parks 2. Wildlife Sanctuaries 3. Biosphere reserve 4. Sacred lakes and grooves B. Ex-situ conservation 1. Sacred plants 2. Offsite collections 3. Gene banks 4. Cryopreservation C. Administrative bodies for conservation of biodiversity 1. World Conservation Union (WCU) 2. World Wide Fund for Nature (WWF) 3. Red Data Book or Red List	• Describe the conservation of plant species and animal species, both *in-situ* and *ex-situ*, and the associated advantages and disadvantages. • Identify the Protected areas of Bhutan and discuss how they contribute to conservation of the environment. • Discuss the roles of zoos and botanical gardens with reference to captive breeding and release programs and gene banks. • Describe the roles played by WCU and WWF in conservation of biodiversity. • Explain the categorisation of species into different levels according to Red Data Book.	
18. Sustainable Management of Natural Resources	18.1. Management of natural resources A. Strategies for management of natural resources 1. Adaptive management 2. Natural resource management 3. Integrated Natural Resource Management (INRM) 4. Landscape level management 5. Command and control management 6. Three Rs to save the environment	• Explain how the management of an ecosystem can provide resources in a sustainable way (e.g. timber production). • Describe different strategies used to manage natural resources. • Explain how these strategies contribute to minimize human effect on environment.	**3**
	18.2. Agriculture and ecosystem	• Evaluate the increased risk of land degradation and flood susceptibility from unsustainable cropping practices,	

	A. Benefits of maintaining the biodiversity for agriculture Rrole of gene banks in maintaining traditional varieties B. Impacts of intensive farming or green revolution Impacts discussed in brief C. Use of biofertilisers and biological controls 1. Use of biofertilisers in place of chemical fertilisers 2. Biological Pest Control 3. Integrated Pest Management (IPM) D. Crop rotation 1. Principles of crop rotation Advantages of crop rotation	overgrazing and deforestation resulting in reduced productivity. • Explain the benefits for agriculture of maintaining the biodiversity of animal species and plant species, and the role of gene banks in maintaining traditional varieties. • Compare natural ecosystems and those resulting from intensive farming, in terms of energy input, productivity and genetic diversity.	
	18.3.Ethnobotany A. Concepts of ethnobotany and Non-Wood Forest Products B. Terminologies of ethnobotany C. Community forestry in Bhutan	• Describe the benefits associated with developing Non-Wood Forest Products (NWFPs). • Explain how ethnobotany helps us to understand the dependency of human on natural resources. • Describe community forestry in Bhutan to depict the benefits of community forestry to the community and the environment.	

BIOLOGY Practical for Class XI

Sl No	Name of the Experiment	Aim	Objective	Material Required
1.	Floral characteristics	To study the floral characteristics of Malvaceae and Solanaceae.	• Dissect the floral specimens. • Draw floral diagrams of the specimens. • Write floral formulae of the specimens. • Describe the specimens using semi-technical terms. • Identify the family of the specimens based on their floral characteristics. • Compare the specimens using semi-technical terms.	Solanaceae and Malvaceae flowers, 131lycerine, dissecting microscope forceps, razor, needle, glass slides, blotting paper, brush droppers, cover slips, and hand lens.
2.	Anatomy of dicot and monocot stems	To prepare temporary slides of T.S dicot and monocot stems.	• Prepare temporary slides of T.S of a dicot stem and a monocot stem. • Observe the specimens under compound microscope. • Identify the prominent structures of the specimens. • Draw the labelled diagrams of the specimens. • Compare the specimens.	Dicot monocot stem, compound microscope, razor, forceps, watch glass, brush, dropper, glass slide, cover slip, needle and blotting paper, safranin and 131lycerine.
3.	Specimens on permanent slides	To study the permanent slides of mammalian pancreas and mitosis	• Observe and identify the specimen. • Draw the labelled diagrams of the specimen. • Comment on the characteristic features of the specimen.	Permanent slide of mammalian pancreas, mitosis, and microscope.
4.	Study of models	To study models and organs of animals.	• Identify the different parts of the model. • Draw and label different parts of model. • State the function of each part identified.	Model of heart, brain, and DNA.

5.	Plant and animal specimens	To study and identify the plant and animal specimens.	• Identify the specimen based on the characteristic features. • Classify the specimen till the class level. • Draw and label the features of the specimen.	Specimens of spirogyra, fern, hydra, crab, any species from Annilida, pine, and mosses, any common angiospermic plant, and any vertebrates-fish and amphibian species. May require handlens and/or microscope

Biology Practical for Class XII

Sl No	Name of the Experiment	Aim	Objective	Material Required
1	Study of floral characteristics	To study the floral characteristics of Papilionaceae and Brassicaceae	• Dissect the floral specimens. • Draw the floral diagrams of the specimens. • Write the floral formulae of the specimens. • Describe the flowers using semi-technical terms. • Identify the family based on their floral characteristics. • Compare the flowers using semi-technical terms.	Papilionaceae and Brassicaceae flowers, glycerin, dissecting microscope forceps, razor, needle, glass slides, blotting paper, brush droppers, cover slips, and hand lens.
2.	DNA extraction	To extract deoxyribonucleic acid (DNA) from plant tissue.	• Extract DNA from the living tissues. • Verify the presence of DNA in living tissues.	Onion, cutting board, blender, knife, hot water bath, beakers, filter paper, funnel, test tube, ice water, glass rod, stopwatch, thermometer and tablespoon, common salt, liquid detergent and ice cold 95% ethanol.
3.	Water potential	To determine the water potential of potato tuber.	• Relate water potential to molarity. • Demonstrate water potential of plant tissue by weight change method. • Demonstrate water potential of plant tissue by length change method.	Potato tuber, test tubes, cork, cork borer, ruler, filter paper and digital weighing machine, sucrose solution and distilled water.

4.	Anatomy of dicot and monocot roots	To prepare temporary slides of T.S dicot and monocot roots.	• Prepare temporary slides of T.S of a dicot root and a monocot root. • Observe the specimens under the compound microscope. • Identify prominent structures of the specimens. • Draw labelled diagrams of the specimens. • Compare the specimens	Dicot and monocot root, compound microscope, razor, forceps, watch glass, brush, dropper, glass slide, cover slip, needle and blotting paper, safranin and glycerine.
5.	Specimens on permanent slides	To study the permanent slides of mammalian testis and root apex	• Observe and identify the specimen. • Draw the labelled diagrams of the specimen. • Comment on the characteristic features of the specimen.	A permanent slide mammalian testis and root apex and microscope.
6.	Study of models	To study models and organs of animals.	• Identify the different parts of the model. • Draw and labelled different parts of model. • State the function of each part identified.	Model of human ear and eye.
7.	Plant and animal specimens	To study and identify the plant and animal specimens.	• Identify the specimen based on the characteristic features. • Classify the specimen till the class level. • Draw and label the features of the specimen.	Specimens of liverwort, lichen, any common angiospermic plant, prawn, any species of Mollusca, any species of Nematode and Platyhelminthes, and any vertebrates- reptile, bird and mammal. May require hand lens and/or microscope

8. CHEMISTRY

Subject: CHEMISTRY **Class: XI**

STRAND	CHAPTER	SCOPE		Weighting
		TOPIC/SUB-TOPIC	**LEARNING OBJECTIVES**	
Materials and their Properties	**1.Atomic Structure** **2. Periodic Table**	➢ Introduction ➢ Discovery of electrons ✓ Properties of Cathode Rays ➢ Charge on Electron (e/m Ratio) ➢ Discovery of protons ➢ Discovery of neutrons ➢ Thomson Model of atom ➢ Ruther Ford's Experiment and Model ✓ Failure of Rutherford's Atomic Model ➢ Bohr's Model of the Atom ✓ Atomic number and mass number ➢ Nuclear structure ➢ Relative atomic masses ✓ Concept of Atomic Orbital ➢ Quantum Numbers ➢ Shapes of Orbitals ➢ Energy level diagram for Multi-electron Atoms ➢ Filling of Orbitals ➢ Electronic Configuration of Elements ➢ Some Exceptional Electronic Configuration	• Explain the discovery of electrons, protons and neutrons. • Describe different types of atomic model along with their limitations. • Explain an isotope is in terms of atoms of the same element with different numbers of neutrons in the nucleus. • State that C^{12} is used as the standard measurement of relative masses. • Define the term relative atomic mass based on the C^{12} isotope. • Calculate the relative atomic mass of an element when the relative abundances of its isotopes are given. • Calculate relative molecular mass and relative formula mass from relative atomic masses. • Explain four types of Quantum number. • Explain filling of orbitals based on Aufbau principle, Pauli's exclusion principle and Hund's rule of maximum multiplicity. • Describe the shapes of s-orbital, p-orbital and d-orbital. • State the number of orbitals making up s-sub shell, p-sub shell and d-sub shell and the number of electrons that occupy s-sub shell, p-sub shell and d-sub shell.	**10 %**

		➢ Prediction of Period, Group and Block of a given Element ➢ Atomic or Periodic Properties ➢ Atomic Radius ✓ Variations of Atomic Radii in the periodic Table ✓ Comparison of the Ionic and Atomic Radii ➢ Ionization enthalpy or Ionization Energy or Ionization potential ✓ Successive Ionization Enthalpies ✓ Factors on which Ionization Enthalpy Depends ✓ Ionization Enthalpy is a function of Atomic Number ✓ Variation of Ionization Enthalpy in a Group ✓ Variation of Ionization Enthalpy in a period ➢ Melting points and Boiling points	- • Classify an element as s-block, p-block or d-block based on its position in the Periodic Table. • Describe the trends in atomic radius, first ionisation energy, melting and boiling points of the elements in the second period (Li-Ne) and third period (Na-Ar). .	**11 %**

	3. Chemical Bonding	➢ Introduction ➢ Types of Chemical Bonds ➢ Electrovalent bond or ionic bond ➢ Electrovalency ✓ Variable Electrovalency ✓ Formation of ionic Bond is accompanied by decrease in Energy ➢ General Properties of Ionic Compounds ➢ Covalent Bond – Lewis Concept ✓ Types of Bonds ✓ Example of Single Bond ✓ Example of Double and Triple Bonds ➢ Covalency ✓ Variable Covalency ✓ Cause of Variable Covalency ✓ Formation of Covalent Bonds and Periodic Table ➢ Violation of Octet Rule ✓ Explanation of the failure of Octet rule Chemical Bonding ➢ Characteristics of covalent Compounds ➢ Comparison between the properties of Electrovalent and Covalent Compound ➢ Limitations of Lewis Concept of Covalent Bond ➢ Coordinate or Dative Bond ➢ Some examples of Coordinate Molecules	• Explain the formation of ionic bond. • Draw dot and cross diagrams to show the electron arrangement of ions in ionic bonding. • Describe the general properties of ionic compounds. • Explain the formation of different types of covalent bond. • Draw dot and cross diagrams to describe single covalent bonding (e.g. Cl2, HCl, H2O, CH4), multiple covalent bonding (e.g. O2, N2, CO2), dative covalent (coordinate) bonding (e.g. H3O+, NH4+, H2SO4, HNO3, oxyacids of chlorine), molecules and ions (e.g. NO3-, $SO4^{2-}$,$CO3^{2-}$). • Describe the general properties of covalent compounds. • Explain the formation of coordinate bond. • Explain different types of hybridization of orbitals. • Explain the shapes and bond angles in molecules based on hybridization and VSEPR theory. e.g. BF3 (trigonal planar), CH4 and NH4+ (tetrahedral), SF6 (octahedral), NH3 (pyramidal), H2O (non linear), CO2 (linear). • Polar molecules. • Define term electronegativity and explain that the atoms of some elements are more electronegative than others. • Use the concept of electronegativity to explain that some molecules, e.g. HCl,	**12%**

		➢ Properties of Coordinate Compounds ✓ Lewis Structure of Some Ions ➢ The Shapes of Molecules and Ions ✓ Hybridization of orbital ✓ Necessary Conditions for Hybridization ✓ Types of Hybridization ✓ Factors influencing Shapes of Molecules ➢ Shapes of Certain Molecules ✓ Formula for Predicting Type of Hybridization and shapes of Molecules ➢ Polar Molecules ✓ Electronegativity ➢ Polarity in Covalent Bonds ✓ Partial ionic Character of Covalent Bond ➢ Dipole Moment ✓ Application of Dipole Moment ➢ Partial Covalent Character in Ionic Compound. ➢ Fajan's Rule ➢ Hydrogen Bond. ✓ Requirement for hydrogen bond. ✓ Types of hydrogen bond ✓ Some consequences of hydrogen bond. ➢ Metallic bond ➢ van der Waals' forces.	CH3Cl, have polar bonds and are permanent dipole. • Intermolecular forces • Describe the origin of intermolecular forces e.g. Van der Waals forces (based on induced dipoles e.g.N2, H2, O2), dipole-dipole forces (based on permanent dipoles e.g. HCl and CH3Cl). • Describe hydrogen bonding in molecules such as H2O, NH3, HF. • Explain, using hydrogen bonding, the anomalous properties of the hydrides of the second period e.g. NH3, H2O and HF. • Metallic bonding • Describe the structure of metals in terms of the attraction of positive metal ions to a delocalised 'sea' of electrons.	

	4. Oxidation number.	➢ Introduction ➢ Classical concept of oxidation and reduction**.** ➢ Electronic concept of oxidation and reduction reactions. ➢ Redox reactions ➢ Oxidizing agent (oxidant) ➢ Reducing agent (reductant) ➢ Activity based on oxidation-reduction phenomenon ➢ Oxidation number or oxidation state ➢ Nomenclature ➢ Definition of oxidation and reduction in terms of oxidation number.	• Apply the rules for assigning oxidation numbers to atoms in elements, compounds and ions. • Explain oxidation and reduction in terms of electron transfer and changes in oxidation number. • Write chemical formulae using oxidation numbers.	**6 %**
	8.Chemical Equilibria	➢ Introduction ➢ Irreversible Reactions ➢ Equilibria involving physical change ➢ General characteristics of Equilibria involving Physical Process ➢ Equilibria in chemical process :Dynamic equilibrium ➢ Concepts of chemical equilibrium: ✓ Main features of chemical equilibrium ➢ Laws of chemical equilibrium from law of mass action.	• Give examples of chemical reactions that are reversible. • Explain the dynamic nature of a reaction in equilibrium as applied to states of matter, solutions and chemical reactions. • Apply Le Chatalier's principle to predict the effects of changes in concentration, pressure and temperature on the position of equilibrium in homogenous reactions. • Explain that a catalyst speeds up the attainment of equilibrium but not its position.	**11 %**

	9.Phase Equilibria	➢ Introduction ➢ Explanation of the terms ✓ Phase ✓ Components ✓ Degree of freedom ➢ Equilibrium ➢ Criteria for phase Equilibrium ✓ Criteria for two phase Equilibra for one component system ➢ Phase Diagram ✓ One component system ➢ Phase Diagram for water system- ✓ Curves ✓ Areas ✓ Triple system ➢ Vapour pressure of a liquid: ✓ Important factors that affect the vapour pressure ✓ Boiling point of a liquid ✓ Heat of vaporization of a liquid ➢ Dalton's Law of partial pressure ➢ Ideal and non-ideal solutions ✓ Vapour pressure-composition diagram for ideal system ✓ Vapour pressure - composition curves for non-ideal system. ✓ Vapour pressure-composition diagram ✓ Boiling point -composition diagram	• Explain the term vapour pressure and its measurement and that it is affected by temperature. • Describe the relationship between vapour pressure and boiling point. • Explain the meaning of the term ideal solution. • Describe influence on the vapour pressure of an ideal solution by its composition. • Convert boiling point and composition curves into vapour pressure and composition curves. • Classify two component mixtures as ideal or showing positive or negative deviation from an ideal solution. • Explain positive and negative deviations from an ideal solution in terms of intermolecular forces. • Demonstrate that vapour pressure and composition curves can be constructed from knowledge of Raoult's law and Dalton's law of partial pressures. • Draw a vapour pressure and composition and a boiling point and composition diagram for an ideal solution showing the compositions of the liquid and vapour. • Explain the term phase diagram. • Explain the principles for fractional distillation for ideal solutions. • Draw phase diagrams for non-ideal mixtures showing gross positive and negative deviation.	**12 %**

		✓ How to construct vapour pressure –composition curve from the knowledge of Raoult's law and Dalton's law. ➢ Azeotropes ➢ Principle of fractional distillation of ideal solution	• Explain the term azeotropic mixture (for constant boiling mixtures).	
	10. Introduction to organic chemistry	➢ Functional groups ➢ Homologous series ✓ Characteristic of a Homologous series ➢ Nomenclature of Organic Compounds ➢ IUPAC system for naming organic compounds ✓ Nomenclature of different classes of organic compounds**.** ➢ General Rules for Naming Organic Compounds ➢ Rules of IUPAC Nomenclature for Branched Chain Alkanes ➢ Rules of IUPAC Nomenclature for Unsaturated Hydrocarbon. ➢ Rules of IUPAC Nomenclature for Compounds Containing One Functional Group, Multiple bonds and Substituent. ➢ Rules of IUPAC Nomenclature for Polyfunctonal Compounds. ➢ Writing structural formula from the IUPAC name of the compound.	• State the difference among structural formula, homologous series and functional group. • Represent an organic compound in terms of empirical formula, molecular formula and structural formula. • Apply the IUPAC rules to the nomenclature of simple organic compounds. • Explain different types of isomerism in organic compounds.	**11 %**

		➢ Nomenclature of Aromatic Compounds ✓ Name of some aromatic compounds. ➢ Some common organic compounds ➢ Isomerism ✓ Chain isomerism ✓ Position isomerism ✓ Functional isomerism ✓ Metamersim ✓ Tautomersim ➢ Types of Organic Reactions ➢ Nucleophiles and Electrophiles ✓ Nucleophilic reagent or nucleophiles ✓ Electrophilic reagent or electrophiles. ➢ Mechanism of a Reaction ✓ Mechanism of free-radical reaction ✓ Mechanism of a polar reaction**.**		
	11. Hydrocarbons: alkanes, alkenes and alkynes	➢ Introduction ➢ Classification of hydrocarbon. ➢ Classification of Aliphatic Hydrocarbons **Alkanes** ➢ Structural isomerism in Alkanes ➢ Chemical properties of alkanes	• Write the general formula for alkanes (CnH2n+2) and the correct formulae for any aliphatic alkane. • Explain that the principle type of isomerism in alkanes is structural isomerism and draw and name structural isomers for alkanes with the same chemical formula e.g. C6H14. • Substitution reactions of alkanes. • Describe the reactions of alkanes with chlorine.	**13%**

		Alkenes ✓ Structure of alkenes ✓ Isomerism in alkenes ✓ E and Z system of Nomenclature ➢ Physical properties of alkenes ➢ Chemical properties of alkanes ➢ Polymerisation ✓ Terms used in polymers ✓ Homopolymers and copolymers ➢ Classification of polymers based on source ➢ Classification of polymers based on structure ➢ Classification of polymers based on synthesis ➢ Classification of polymers based on intermolecular forces ➢ Addition polymers	• Explain the mechanism of free radical substitution for the reaction of alkanes with chlorine (initiation, propagation and termination). • Alkenes • Structure, bonding and isomerism • Explain the general formula of alkenes (CnH2n) and write correct formulae for any aliphatic alkene. • Apply the IUPAC rules to the nomenclature of simple alkenes. • Explain that alkenes are unsaturated hydrocarbons. • Addition reactions of alkenes. • Describe the reactions of alkenes with Br2, H2SO4 and HCl. • Explain the mechanism of electrophilic addition for the reaction of alkenes with Br2, H2SO4 and HCl. • Explain that bromine can be used as a test for unsaturation. • Predict, using Markovnikov's rule, the products of addition of HCl to unsymmetrical alkenes. • Explain the pattern of addition of HCl to unsymmetrical alkenes referring to the relative stabilities of primary, secondary and tertiary carbocation intermediates. • Describe how margarine is manufactured by catalytic hydrogenation of unsaturated vegetable oil. • Polymerisation • Describe the addition polymerisation of alkenes for examples like the formation	

		Alkynes ✓ Structure of alkynes ✓ Nomenclature of alkynes ✓ Isomerism in alkynes ➢ Laboratory preparation of acetylene ➢ Physical properties of alkynes ➢ Chemical properties of alkynes ➢ Distinction between alkane, alkene and alkynes	of poly(ethene), poly(propene), polytetrafluoroethene (PTFE), polyvinylchloride (PVC), polystyrene and natural and synthetic rubber. • State uses of polymers e.g. poly(ethene), poly(propene), polytetrafluoroethene (PTFE), and polyvinylchloride (PVC). • Identify the repeating unit, the monomer unit, using the structure of the polymer. Alkynes • Structure, bonding and isomerism. • State the general formula of alkynes (CnH2n-2) and write correct formulae for any alkyne. • Explain that alkynes are unsaturated hydrocarbons. • Describe the preparation of ethyne from natural gas. • Addition reactions of alkynes • Describe the reactions of alkynes with H2, Br2 and HCl. • Explain the mechanism of electrophilic addition for the reaction of alkynes with Compare and contrast the reactions of alkanes, alkenes and alkynes	
	13. Alcohols	➢ Introduction ➢ Nomenclature of Alcohols ➢ Primary , secondary and tertiary alcohols ➢ General method of Preparation of alcohols ➢ Manufacture of alcohols ➢ Structure of alcohols ➢ Physical properties of alcohols	• Apply the IUPAC rules to the nomenclature of simple alcohols. • Classify alcohols as primary alcohol, secondary alcohol or tertiary alcohol and name them accordingly. • Reactions of alcohols • Describe the oxidation of primary alcohols to form either aldehydes or	**6 %**

		➢ Chemical properties of alcohols ✓ Reactions involving the cleavage of R-O-H bond. ✓ Reactions involving the cleavage of R-C-OH bond. ➢ Reactions involving both the alkyl, and the hydroxyl groups	carboxylic acids depending on the reaction conditions. • Describe the oxidation of secondary alcohols to form ketones. • Explain that tertiary alcohols are resistant to oxidation. • Describe the elimination of water (H2O) from alcohols in the presence of an acid catalyst.	
	14. Aromatic compounds (BENZENE AND PHENOL)	➢ Introduction ➢ Aromatic Hydrocarbon (Arenes). ➢ Structural of Benzene ➢ Laboratory Methods of Preparing Benzene ➢ Properties of benzene . ➢ Physical properties ➢ Chemical properties ➢ General mechanism of Electrophilic Substitution in Benzene. ➢ Effect of Substituent on the Orientation and Reactivity of Benzene ➢ Phenols ➢ Nomenclature of Phenols ➢ General method of Preparation of Phenols ➢ Manufacture of Phenols ➢ Structure of Phenols ➢ Properties of Phenols**.** ✓ Physical properties ✓ Chemical properties ➢ Commercial Preparation of Phenols.	• Explain the structure of benzene and compare the Kekule and delocalised models for benzene in terms of p-orbital overlap forming π bonds. • Use the evidence (e.g. bond lengths, enthalpy of hydrogenation and resistance to reaction compared to alkenes) to explain how this supports the delocalised model for the structure of benzene. • Explain that delocalization gives stability to the benzene molecule. • Electrophilic substitution of arenes • Describe the reactions of arenes with concentrated nitric acid in the presence of sulfuric acid. • Explain the mechanism of electrophilic substitution for the reaction of arenes with concentrated nitric acid in the presence of concentrated sulfuric acid. • Explain the mechanism of electrophilic substitution for the reaction of arenes with a halogen in the presence of a halogen carrier. • Explain the mechanism of electrophilic substitution for the halogenations	**8 %**

			reactions of arenes limited to monosubstitution of the arene only. • Explain the mechanism of Friedel' Crafts alkylation and acylation reaction Describe the industrial preparation of phenol from petroleum oil. • Describe the preparation of phenol from sodium benzenesulfonate, chlorobenzene (Dow's process) and from the hydrolysis of diazonium salts. • Explain why phenol is more reactive than benzene and therefore more susceptible to Electrophilic substitution. • Explain the substitution patterns (ortho and para) for phenol. • Describe the reactions of phenol with dilute and concentrated nitric acid and Kolbe's reaction to form salicylic acid (2-hydroxybenzoic acid).	

Subject: CHEMISTRY **Class: XII**

STRAND	CHAPTER	SCOPE		Weighting
		TOPIC/SUB-TOPIC	**LEARNING OBJECTIVES**	
Materials and Their Properties	**1.Colligative properties**	**Concentration units of solution :** ➢ Molarity ➢ Molality ➢ Normality ➢ Mole fraction	• Define molarity, molality, normality and mole fraction. • State units of molarity, molality, normality and mole fraction. • Write the mathematical expression for molarity, molality, normality, mole fraction and solve numerical problems using it. • Compare molarity and molality. • Establish relationship between molarity and normality.	**9 %**
		Relative lowering of vapour pressure: ➢ Explanation on how the presence of solutes in a solution (composition) affects the vapour pressure. ➢ Expression of Raoult's Law ➢ Solved numerical problems ➢ Determination of RMM ➢ Exercises	• Explain the term colligative property. • Describe the dependence of vapour pressure on the composition of the solution. • Explain Raoult's Law and write its mathematical expression. • Calculate the relative molecular mass of non-volatile solutes based on relative lowering of vapour pressure.	
		Elevation in boiling point : ➢ Explanation on how the presence of solutes in a solution (composition) affects the boiling point. ➢ Expression ➢ Solved Numerical problems ➢ Determination of RMM ➢ Exercises	• Describe the dependence of boiling point due to presence of non-volatile solute in a solution. • Explain that elevation in boiling point is a Colligative property. • Write a mathematical expression to calculate RMM. • Calculate the relative molecular mass of non-volatile solutes based on elevation in boiling point.	

		Depression in freezing point : ➢ Explanation on how the presence of solutes in a solution (composition) affects the Freezing Point. ➢ Expression ➢ Determination of RMM by Beckman's Method ➢ Solved Numerical problems ➢ Determination of RMM ➢ Exercises	• Describe the dependence of freezing point due to presence of non-volatile solute in a solution. • Explain that depression in freezing point is a Colligative property. • Write a mathematical expression to calculate RMM. • Calculate the relative molecular mass of non-volatile solutes based on depression in freezing point.	
		Osmotic pressure : ➢ Explanation on how the presence of solutes in a solution (composition) affects the osmotic pressure. ➢ Expression ➢ Solved Numerical problems ➢ Determination of RMM ➢ Exercises	• Describe the dependence of osmotic pressure due to presence of non-volatile solute in a solution. • Explain that osmotic pressure is a Colligative property. • Write a mathematical expression to calculate RMM. • Calculate the relative molecular mass of non-volatile solutes based on osmotic pressure.	
	2. Acid-base equilibria	**Ionic equilibrium :** ➢ Dissociation of electrolytes in aqueous solution	• Define ionic equilibrium. • Explain how electrolytes dissociate in aqueous solution.	**10 %**
		Degree of dissociation : ➢ Definition ➢ Factors ➢ Oswald's dilution Law ✓ Derivation and then Statement ✓ Calculation	• Define degree of dissociation. • Write the mathematical expression for degree of dissociation. • Explain factors that affect the degree of dissociation. • Explain Ostwald's dilution Law.	

			• Derive the mathematical expression for Ostwald's dilution Law and solve numerical problems based on the law.	
		Strength of acid and base : ➢ Ionization constant of acid (K_a) and base (K_b) ➢ Significance of K_a and K_b ➢ Numerical problems based on K_a and K_b	• Explain the strength of acids and bases based on the value of K_a and K_b . • Solve numerical problems based on K_a and K_b	
		Bronsted-Lowry concept of acid and base (Protonic concept). ➢ Conjugate acid-base pairs	• Explain Bronsted- Lowry concept of acid and base. • Explain conjugate acid-base pairs.	
		Ionic product of water (K_w): ➢ pH and pOH ✓ Expression and numerical problems ➢ pH indicators ✓ characteristics ✓ phenolphthalein ✓ methyl orange	• Define Ionic product of water (K_w). • Explain and write the mathematical expression for pH and pOH. • Solve numerical problems based on pH and pOH. • Mention the characteristics of pH indicators.	
		Neutralization ➢ Strong acid vs strong base ✓ Use of appropriate pH indicators ➢ Weak acid vs strong base ✓ Use of appropriate pH indicators ➢ Strong acid vs weak base ✓ Use of appropriate pH indicators ➢ Weak acid vs weak base ✓ Use of appropriate pH indicators	• Explain the suitability of phenolphthalein and methyl orange as pH indicators.	
		Buffer solution ➢ Preparation of buffer solution ➢ Types of buffer solution ➢ Buffer action	• Explain buffer solution and buffer action. • Explain types of buffer solutions and their preparations. • Mention applications of buffer.	

		➢ Application of buffer ✓ Blood and cytoplasm of cells		
	3.Redox equilibria	**Electrochemical cell or Galvanic cell**: ➢ Construction of electrochemical cell ✓ Construction of Daniel cell ✓ Flow of electrons and mechanism of current production. ➢ Representation of galvanic cell or electrochemical cell ✓ Oxidation half cell reaction ✓ Reduction half cell reaction ✓ Net cell reaction	• Explain the construction and the working of electrochemical cell. • Represent oxidation half cell, reduction half cell and net cell reaction.	**10 %**
		Electrode potential : ➢ Types of electrode potential ➢ Factors affecting electrode potential	• Explain electrode potential and the factors affecting electrode potentials.	
		Electrochemical series: ➢ Application of electrochemical series ➢ Standard Hydrogen Electrode (SHE) ✓ Construction of SHE ➢ Measurement of standard electrode potential using SHE	• Explain the applications of electrochemical series. • Describe construction and working of SHE as reference electrode.	
		emf of a galvanic cell: ➢ Calculation of emf of a galvanic cell under standard conditions ➢ Calculation of emf of a galvanic cell under non-standard condition using Nernst equation. ➢ Application of electrochemical cells (in general).	• Calculate EMF of a Galvanic cell at standard and non-standard conditions. • Mention applications of an electrochemical cell.	
	4.Chemical Kinetics	**Rate of reaction:** ➢ Rate equation and rate constant	• Explain rate of reaction in relation to rate equation and rate constant.	

		Molecularity of reaction	• Describe molecularity of a reaction.	**9 %**
		Order of reaction ➢ Zero, first and second order of reaction (include graphical method) ➢ Rate determining steps and reaction mechanism ➢ Units of order of reaction	• Explain zero, first and second order of reaction and mention their units. • Explain why slowest step is the rate determining step in a chemical reaction. •	
		Experimental determination of order of reaction (Zero, first and second order): ➢ Determination of rate equation by initial concentration method (based on given data) ➢ Numerical problems	Determine the order of reaction and rate constant using the data provided.	
	5.Nuclear chemistry	**Nature of radioactive elements:** ➢ Briefly describe N/P ratio	• Describe nuclear stability with reference to N/P ratio.	**5 %**
		Types of radioactive rays: ➢ Properties Penetrating power, ionization energy, biological damage, …	Describe the types of radioactive rays and their properties.	
		Mode of decay: equation	• Explain modes of decay using nuclear equation.	
		Group displacement law: ➢ Illustration with examples	• State group displacement law.	
		Transmutation: ➢ Nuclear reaction	• Explain nuclear transmutation.	

		Tracer elements and their uses: ➢ Phosphorus 30 and 32, iodine 131, cobalt 60, sodium 24, etc.,	• Mention the application of radio isotopes.	
	7. Coordination chemistry	**Transition elements:** ➢ Position in the periodic table ➢ Electronic configuration ➢ Characteristics ✓ Variable oxidation state ✓ Formation of coloured ions ✓ Formation of complex compounds ✓ Catalytic properties	• Justify the position of transition elements in the periodic table. • Describe the characteristics of transition elements.	**7 %**
		Coordination compounds ➢ Terms used in coordination chemistry ✓ Central atom or ion ✓ Ligands ✓ Coordination spheres or coordination entity ✓ Ionic spheres ✓ Coordination number ✓ Oxidation number ✓ Charge of the complex ✓ Denticity ➢ Types of ligands i. Classification on the basis of charge 1. Neutral ligand, anionic and cationic ligand b. Classification on the basis of mode of attachment	• Explain the terms used in coordination compounds. • Classify ligands on the basis of charge and mode of attachment.	

		1. Monodentate, bidendate and polydentate		
		Werner's Coordination Theory	• Explain Werner's coordination theory.	
		Nomenclature of coordination compounds : ➢ Rules for writing the formula of complex ion or compound ➢ Rules for writing the IUPAC name of coordination compound	• Write the formula of coordination compounds from the IUPAC names given. • Write IUPAC name of coordination compounds.	
		Colour exhibited by coordination compound	• Explain why coordination compounds exhibit colour.	
		Uses of transition metal ion complexes : ➢ Catalyst (V_2O_5, Cr_2O_3 and Fe) ✓ Efficiency of catalyst ▪ Heterogeneous catalyst (examples) ▪ Homogeneous catalyst (examples) ➢ Medicine ✓ Cisplatin ➢ Reagents ✓ Tollen's reagent ➢ Biological importance ✓ Hemoglobin, ✓ chlorophyll	• Explain the uses of transition metal/coordination complexes.	
	8. Carbonyl compounds	**Nomenclature of Carbonyl Compounds:** ➢ Aldehydes ✓ Common naming system (formaldehyde, acetaldehyde, benzaldehyde) ✓ IUPAC system ➢ Ketones	• Write IUPAC names and common names of aldehydes and ketones.	**8 %**

		✓ Common naming system (acetone) ✓ IUPAC system		
		Properties of carbonyl compounds: ➢ Physical Properties ✓ Aldehydes ✓ Ketones ➢ Chemical properties ✓ Aldehydes ➢ Oxidation ✓ Acidified $K_2Cr_2O_7$ ✓ Tollen's reagnt ✓ Fehling's solution ➢ Reduction ✓ $NaBH_4$ ➢ Addition reaction ✓ HCN ✓ Explain nucleophilic addition reaction ✓ Cannizaro reaction (formaldehyde and benzyldehyde) ➢ Ketones ✓ Reduction i. $NaBH_4$ ✓ Addition reaction i. HCN	• State physical properties of Aldehyde and ketones. • Explain the chemical properties of Aldehyde with respect to oxidation, reduction and addition reactions. • Explain the chemical properties of ketone with respect to reduction and addition reactions	
	9. Carboxylic acids	**Nomenclature of carboxylic acid (formic acid, acetic acid, benzoic acid and oxalic acid):** ➢ Common naming system ➢ IUPAC system	Write the IUPAC and common names of carboxylic acids.	**9%**

		Preparation of carboxylic acid: ➢ Formic acid from methanol ➢ Acetic acid from ethanol ➢ Oxalic acid from cane sugar ➢ Benzoic acid from benzyl alcohol.	• Explain the preparation of: formic acid from methanol, acetic acid from ethanol, oxalic acid from cane sugar and benzoic acid from benzyl alcohol.	
		Properties of carboxylic acids: ➢ Physical properties of carboxylic acid ✓ Include solubility of carboxylic acids in water due to hydrogen bonding. ➢ Chemical Properties of Carboxylic acid. ✓ Neutralization reaction with alkali (NaOH), carbonates (Na_2CO_3) and bicarbonate ($NaHCO_3$). ✓ Esterification (reaction with ethanol).	• Compare the solubility of different carboxylic acid in water. • Describe the chemical properties of carboxylic acids in terms of neutralization and esterification.	
	10. Carboxylic acid derivatives	**Acetyl chloride** ➢ Common naming system ➢ IUPAC naming system ➢ Preparation ✓ From glacial acetic acid with PCl_5 and $SOCl_2$ ➢ Physical properties ➢ Chemical properties ✓ Mechanism of nucleophilic addition-elimination reaction i. Hydrolysis ii. Alcoholysis iii. Ammonolysis iv. Reaction with ethylamine	• Write the IUPAC and common name of acetyl chloride. • Describe the preparation of acetyl chloride by reacting acetic acid with PCl_5 and $SOCl_2$. • State physical properties of acetyl chloride. Explain the nucleophilic addition-elimination reaction of acetyl chloride in terms of: hydrolysis, alcoholysis, ammonolysis and reaction with ethylamine.	
		Ethyl acetate (ester) ➢ Common naming system	• Write the IUPAC and common name of ethyl acetate.	

		➢ IUPAC naming system ➢ Preparation ✓ From glacial acetic acid and ethanol in presence of conc. H_2SO_4 ➢ Physical properties ➢ Chemical properties ✓ Hydrolysis i. In acidic medium ii. In alkaline medium (Saponification) ➢ Fats ✓ Definition ✓ Saturated and unsaturated fats ✓ Health risk of saturated fats ➢ Manufacture of biodiesel ✓ reactions between carboxylic acid and alcohol	• Explain the preparation of ethyl acetate from acetic acid and ethanol in the presence of conc.H_2SO_4. • State the physical properties of ethyl acetate. • Explain the chemical properties of ethyl acetate with respect to acid and alkaline hydrolysis (saponification). • Define fats. • Compare saturated and unsaturated fats. • Explain the health risk of saturated fats. • Describe the manufacture of biodiesel from carboxylic acid and alcohol.	**6%**
		Acetamide : ➢ Common naming system ➢ IUPAC naming system ➢ Preparation ✓ Distillation of ammonium acetate in presence of glacial acetic acid ➢ Physical properties ➢ Chemical properties ✓ Hydrolysis i. In acidic medium ii. Alkaline medium ➢ Reduction in presence of sodium-metal and absolute alcohol ➢ Hoffmann degradation reaction ✓ Significance in organic synthesis	• Write the IUPAC name and common name of acetamide. • Explain the preparation of acetamide from ammonium acetate in the presence of glacial acetic acid. • State the physical properties of acetamide. • Explain the chemical properties of acetamide :hydrolysis of (in acidic and alkaline medium), reduction in presence of sodium metal and absolute alcohol and Hoffman degradation reaction.	

	11. Amines	**Classification of amines:** ➢ Aliphatic amines (Primary, secondary and tertiary) ➢ Aromatic amines (aniline)		
		Nomenclature of amines : ➢ Common naming system ➢ IUPAC naming system	Write the common and IUPAC names of amines.	
		Preparation of amines: ➢ Methyl amine from methyl iodide in excess of alcoholic ammonia ➢ Ethylamine amine from ethane nitrile (Mendius reaction) ➢ Aniline from nitrobenzene (reduction)	Explain the preparation of: methyl amine from methyl iodide in excess of alcoholic ammonia, ethyl amine from ethane nitrile (Mendius reaction) and aniline from nitrobenzene.	
		Physical properties	State physical properties of amines.	
		Chemical properties ➢ Basic nature ✓ Reaction with water ✓ Reaction with acids ✓ Basic strength among ammonia, primary aliphatic and primary aromatic amines	• Compare the basic nature of different amines.	
	12. Amino Acids	**General structure and formula of amino acids:**	• Write the general structure and formula of amino acids.	**5%**
		Zwitter ion formation: ➢ Acidic property ✓ Migration of Zwitter ion ➢ Basic property ✓ Migration of Zwitter ion ➢ Isoelectric point ✓ Variation of isoelectric point due to different R group in amino acids.	• Explain amphoteric nature (Zwitter ion) of .amino acids and isoelectric point.	
	14.	**Mass Spectrometry :** ➢ Principle	• Explain the principle of mass spectrometry. • Describe the working of mass spectrometer.	**12 %**

	Analytical Technique	➢ Instrumentation ✓ Ion source ✓ Analyzer ✓ Detector ➢ Application ✓ Interpret mass spectra and fragmentation pattern of molecular ions. ✓ Molecular mass using molecular peaks in the spectrum	• Interpret mass spectra in terms of isotopic abundances. • Describe simple mass spectra and the fragmentation pattern of a molecular ion. • Determine the molecular mass of an organic molecule from its molecular ion peak in a mass spectrum.	
		Infrared spectroscopy : ➢ Principle ➢ Instrumentation ➢ Application ✓ Identification of functional group of a organic compound from the spectra	• Explain the principle Infrared spectroscopy • Describe the working of Infrared spectrometer. • Interpret infrared spectra to identify key functional groups from the organic compound.	
		Nuclear magnetic resonance (NMR) spectroscopy ➢ Principle ✓ Chemical shift ✓ Spin-spin splitting pattern ✓ (N + 1) rule ➢ Instrumentation ➢ Application ✓ Interpretation of NMR spectra for aliphatic hydrocarbon ✓ Industry ad medicine	• Explain the principle of nuclear magnetic resonance spectroscopy. • Explain that nuclear magnetic resonance gives information about the position of H atoms in an organic molecule. • Describe chemical shift using the δ scale for recording. • Deduce the spin-spin splitting patterns of adjacent, non-equivalent protons, limited to simple aliphatic hydrocarbons using the N +1 rule. • Interpret simple **nmr** spectra for aliphatic hydrocarbons to determine their structure. • State the uses of nmr in industry and in medicine.	
		High Performance Liquid Chromatography (HPLC) ➢ Principle ➢ Instrumentation ➢ Application ✓ Separating the volatile liquid mixtures	• Explain the principle and the use of HPLC in separating mixtures of volatile liquids prior to further analysis.	

9. PHYSICS

Subject: Physics **Class: XI**

Chapter	Scope		Weighting
	Topics/Sub-Topic &	**Learning Objectives**	
1. Motion in a Straight Line	1.1 Rest and Motion 1.2 Point object 1.3 Position, Displacement and Path length 1.4 Instantaneous Velocity and Speed 1.5 Acceleration 1.6 Kinematic equations for uniformly accelerated motion	✓ Understand one-dimensional motion. ✓ Determine position, displacement and path-length (distance) ✓ Differentiate between uniform and non-uniform motion using distance-time graph. ✓ Calculate the instantaneous velocity and instantaneous speed. ✓ Determine of total distance travelled by calculating area under speed-time graph. ✓ Determine acceleration using velocity-time graph. ✓ Derive of three kinematic equations of motion graphically.	8%
2. Motion in a Plane	2.1 Scalars and Vector. 2.2 Addition & subtraction of vectors by graphical Method 2.3 Resolution of vectors. 2.4 Laws of vector addition ***(Only Triangle Law)*** 2.3 Projectile Motion	✓ Differentiate Scalar and vector quantities. ✓ types of vectors. ✓ Determine the addition and subtraction of vectors ✓ Resolve a vector into two perpendicular components. ✓ Use triangle law for vector addition ✓ Analyze the projectile motion and calculation of equation of projectile's path. ✓ Calculate the maximum height, horizontal range and time period of projectile ✓ Explain Sonar and Radar techniques to detect very far off objects	10%

3. Laws of Motion	3.1 Law of Inertia. 3.2 Newton's First Law of Motion. 3.3 Newton's Second Law of Motion. 3.4 Newton's third law of motion. 3.5 Conservation of Momentum. 3.6 Common forces in Mechanics. 3.7 Circular Motion.	✓ Explain the law of Inertia and its applications in daily life. ✓ Explain Newton's first law of motion and its applications. ✓ Sate Newton's second law of motion and determine F=ma, as the special case of this law. ✓ Calculate the Impulse due to a force and Impulse-momentum theorem. ✓ Explain Newton's third law of motion and its applications. ✓ State Conservation of momentum and use this law in problem solving. ✓ Describe Collision, impulse and calculation of velocities of objects in collisions in one dimension. ✓ Circular motion (especially uniform circular motion) ✓ Motion of a car on a level and banked road	12%
4. Mechanical Properties of Solids	4.1 Elastic behavior of solids. 4.2 Stress and Strain. 4.3 Hooke's Law. 4.4 Stress-strain Curve. 4.5 Work done by a spring force. 4.6 Elastic Modulus. ***(Exclude Determination of Young's modulus of wire)*** 4.7 Applications of Elastic Behavior of material	✓ Explain Elastic behavior of solids. ✓ State the Stress and their types. ✓ Calculate the stress and corresponding strain on a body. ✓ Describe Hooke's law and its mathematical form. ✓ Explain Stress-strain curve. ✓ Calculate work done by a spring force. ✓ Describe Young's modulus and calculate its value for a material of the given wire. ✓ Explain the applications of elasticity or elastic behavior of materials	8%

5. Work, Energy and Power	Scalar product. 5.1 Work 5.2 Kinetic energy. 5.3 Concept of potential energy. ***(Exclude Elastic Potential Energy, Determining potential Energy Values)*** 5.4 Conservation of mechanical energy. 5.5 Power.	✓ Explain and calculate work done using scalar product of vectors. ✓ Explain the Kinetic energy and its calculation for moving bodies. ✓ Describe the concept of potential energy and its calculation near the Earth's surface. ✓ Describe the Law of conservation of mechanical energy using equations of potential energy and Kinetic energy. ✓ State power and its calculation from work done.	6%
6.Thermal Physics	6.1 Heat, Internal Energy and Work. 6.2 Internal Energy and First Law of Thermodynamics. 6.3 Internal energy at absolute zer0.	✓ Explain the internal energy and its relation with heat and work. ✓ Define the internal energy and first law of thermodynamics. ✓ Relate the internal energy with temperature and minimum value of internal energy at absolute zero.	6%
7.Gravitation	7.1 Universal Law of Gravitation. ***(Exclude Gravitation and principle of super position)*** 7.2 Acceleration due to gravity of the earth. ***(Exclude Shell Theorem)*** 7.3 Acceleration due to gravity below and above the surface of earth. 7.5 Escape Velocity. 7.6 Earth Satellites	✓ Explain Universal Law of gravitation and calculation of gravitational force. ✓ Describe the acceleration due to gravity on the surface of earth. ✓ Explain the variation of acceleration due to gravity with height and depth. ✓ Explain escape velocity and its use in solving problems. ✓ Explain Earth's satellites-orbital velocity and time period of satellites	6%

8. Magnetic Fields	8.1 Magnetic force and field. 8.2 Magnetic Flux. 8.3 Lorentz force. 8.4 Motion of a charged particle in a uniform magnetic field.	✓ Describe the magnetic force and field and calculate the force acting on a charged particle. ✓ Define Fleming's left hand. ✓ Explain Magnetic flux and magnetic flux density and its calculation. ✓ Describe Lorentz force acting on a charged particle. ✓ Explain Magnetic force on a current carrying conductor in magnetic field. ✓ Determine the motion of a charged particle in a uniform magnetic field and auroras. ✓ Identify magnetic field pattern due to a long straight current carrying conductor.	6%

9. Electric Circuits	9.1 Potential difference 9.2 Electric Current 9.3 Electric current in conductors 9.4 Ohm's Law: Resistance and Resistivity ***(Exclude Drift electrons and the origin of resistivity)*** 9.5 Resistivity of various materials 9.6 Electrical energy, Power 9.7 Series and Parallel Circuits 9.8 Cells, EMF and Internal Resistance	✓ Explain potential difference in terms of work done per unit charge. ✓ Explain electric current as net flow of electric charge. ✓ Describe Electric current in conductors. ✓ Verify Ohm's law and its uses in problem solving. ✓ Explain Concept of resistance, resistivity conductance, conductivity and current density. ✓ Explain Limitations of Ohm's law and V-I characteristic graphs of ohmic and non-ohmic conductors. ✓ Calculate an electrical energy and power in electric circuits. ✓ Derive Series and parallel combination of resistors in electrical circuits and calculate the effective resistance and effective conductance for those circuits. ✓ Describe the concept of electromotive force and internal resistance and their calculation in problems.	6%
10. Refection and Refraction	***10.1*** Refraction ***(Exclude the sub-topic Lateral shift by a transparent slab of material and Apparent depth and Normal Shift)*** 10.2 Total Internal Reflection 10.3 Rainbows 10.4 Optic Fibres	✓ Explain the refraction of light, laws of refraction and Snell's law. ✓ Define the refractive index and its calculate refractive index for a pair of media. ✓ Describe total internal reflection and calculate the critical angle for a given pair of media. ✓ Explain optical fibres and its principle. ✓ State the relation between refractive index and critical angle. ✓ Explain the rainbow as an example of internal reflection and dispersion. ✓ Tell the modern applications of fibre optics in medical technology and communications	6%

11. Waves	11.1 Characteristics of transverse and longitudinal waves 11.2 Displacement relation in a progressive wave 11.3 Speed of travelling wave 11.4 Principle of superposition of waves 11.5 Standing waves and resonance	✓ Define wave motion and types of waves. ✓ Calculate of wavelength, frequency, velocity, displacement, amplitude, period and phase. ✓ Differentiate transverse and longitudinal waves along with graphical representations. ✓ Describe progressive wave and calculate its progressive wave. ✓ Calculate wave number, frequency, wavelength, period and angular frequency of progressive wave. ✓ Calculate speed of travelling wave. ✓ Define the superposition principle of wave. ✓ State the similarities and differences between progressive and standing waves.	8%
12. Electromagnetic Waves	12.1 Electromagnetic waves 12.2 Electromagnetic Waves in communication 12.3 Basic Terminology used in electronic communication systems 12.4 Propagation of electromagnetic waves 12.5 Analogue signal and digital signal 12.6 Polarisation of electromagnetic waves	✓ Explain electromagnetic waves ✓ Explain electromagnetic waves in communication, elements of a communication system and basic terminology used in electronic communication systems. ✓ Describe the propagation of electromagnetic waves and calculation of maximum line-of-sight to get digital signals. ✓ Differentiate between analogue and digital signals and sampling of analogue signals to get digital signals. ✓ State the advantages of digital signals in modern communication. ✓ Define polarisation of electromagnetic waves.	6%

13. Atoms	13.1 Atomic masses and Composition of nucleus 13.2 Nuclear Force 13.3 Atomic Spectra 13.4 Bohr model of the hydrogen atom	✓ Describe the basic atomic structure and masses. ✓ Define the proton number and mass number. ✓ Explain Nuclear radius and nuclear force. ✓ Estimation of the density of nuclear matter ✓ Explain atomic spectra and spectral series of hydrogen atom ✓ Explain Bohr's model of hydrogen atom, energy level diagram and calculation of Bohr's radius and total energy of nth orbit for hydrogen atom ✓ Describe Rydberg's formula and its usage in determining wavelength of spectral lines	4%
14. Nuclei	10.1 Atomic masses and mass defect 14.2 Mass-energy (equivalence) relation 14.3 Nuclear binding energy 14.4 Radioactivity ***(simple treatment only)*** 14.5 Nuclear decay equations 14.6 Applications of radioactive isotopes 14.7 Relative risk of radiation exposure	✓ Explain the atomic masses and mass defect calculations ✓ Explain Mass-energy (equivalence) relation ✓ Define Nuclear binding energy ✓ Describe Radioactivity ✓ Law of radioactive decay. Activity and calculation of decay constant of a radioactive sample ✓ Define Half-life and its graphical representation and use in problems ✓ Describe Alpha, beta and gamma decay and their penetration power and ionization power ✓ State Various applications of radioactivity and radioactive isotopes ✓ Assess Relative risks of radiation exposure	4%
15. Sun, Earth and Climate	15.1 Internal structure of sun 15.2 Magnetic fields of the sun and the earth	✓ Explain Conic sections and gravitational orbits ✓ Describe Magnetic field of the sun and the earth ✓ Explain Quasi-biennial oscillations and gravity waves ✓ Explain Global warming and the role of climate forcing in climate change	4%

Subject: Physics **Class: XII**

Chapter	Scope		Weighting
	Topics/Sub-Topic &	**Learning Objectives**	
1. Force & Motion in Fluids	1.1 Fluid resistance under uniform gravitational field. ***(simple treatment of graphs & final expressions for velocity, acceleration & position only) (Exclude the sub-topic Mass and Weight & oil floating on water)*** 1.2 Surface tension. 1.3 Viscosity of fluids. ***(Exclude Measurement of Viscosity)***	✓ Explain fluid resistance under uniform gravitational field. ✓ Describe motion of bodies falling in a uniform gravitational field with fluid resistance**. (*Simple treatment of graphs & final expressions for velocity, acceleration & position only)*** ✓ Define surface tension & surface energy. ✓ Describe cause and effect of surface tension in liquids. ✓ Define angle of contact. ✓ Explain movement of liquids in capillary tubes using ideas of surface tension. ✓ Explain flow of liquids through porous media using capillary action. ✓ Define viscosity of fluids. ✓ Define streamline, laminar and turbulent flow. ✓ State and apply equation of continuity - principle of continuity in any steady state process ✓ State Bernoulli's principle and its application ✓ Define viscosity	8%

2. Oscillations	2.1 Periodic and Oscillatory Motions. *2.2* Simple Harmonic Motion. ***(Focus only on Key Points)*** 2.3 Simple Harmonic motion & uniform circular motion. 2.4 Velocity & acceleration in simple harmonic motion. 2.5 Energy in Simple Harmonic Motion. 2.6 System executing simple harmonic motion: Simple Pendulum. 2.7 Forced Oscillations & Resonance ***(Exclude the sub-topic two cases for oscillator)***	✓ Explain Periodic & Oscillatory motions. ✓ Explain simple harmonic motion ✓ Define time period & frequency of periodic motion ✓ Discuss displacement of periodic motion & its calculation. ✓ Describe the relation between simple harmonic motion and uniform circular motion. ✓ Explain velocity & acceleration in simple harmonic motion. ✓ Describe energy in Simple Harmonic Motion. ✓ Describe the motion of simple pendulum ✓ Explain forced oscillation & resonance ✓ Explain condition for resonance in forced oscillations	15%

4. Electric charges & Fields	4.1 Basic properties of electric charge. 4.2 Coulomb's Law. 4.3 Forces due to multiple charges 4.4 Electric field ***(exclude the Physical significance of electric field)*** 4.5 Electric field lines 4.6 Electric flux & Gaussian surface 4.7 Electric field strength ***(Simple treatment of nature of the path without derivation from sub-topic "Charged particle moving in a uniform electric field"***	✓ Explain the properties electric charges. ✓ Explain Coulomb's law ✓ Describe forces due to multiple charges ✓ Explain electric field & electric field intensity. ✓ Explain electric field lines and their properties ✓ Outline similarities & differences between electric field & gravitational field. ✓ Describe electric flux & Gaussian surface. ✓ Explain electric field strength due to a point charge in radial field ✓ Explain electric field strength between two charged parallel plates ✓ Describe the effect of electric field on a charged particle moving in a uniform electric field	6%
5. Capacitors	5.1 Capacitors & capacitance 5.2 Effect of dielectric on capacitance. 5.3 Energy stored in capacitors	✓ Describe capacitors and capacitance ✓ State unit of capacitance q = CV ✓ Describe combination of capacitors- series & parallel. ✓ Describe energy stored in capacitors.	6%

6. Electromagnetic induction	6.1 Magnetic flux. **(Include only terms & final expression of:** ***A. Magnetic circuit*** ***B. Permeability*** ***C. Magnetic field strength*** ***D. Magnetomotive force*** ***E. Reluctance & permeance without derivation)*** 6.2 The experiments of Faraday & Henry. 6.3 Faraday's laws of electromagnetic induction. 6.4 Lenz's law. 6.5 Inductance***. (Exclude Mutual inductance of two closely wound solenoids)*** 6.6 Transformers. 6.7 AC Generator	✓ Explain magnetic circuit, reluctance and permeance. ✓ Describe the experiments of Faraday & Henry. ✓ Explain Faraday's laws of electromagnetic induction. ✓ Explain Lenz's law. ✓ Explain inductance, self-induction & mutual induction ✓ Calculate self-inductance and coefficient of self- induction ✓ Calculate mutual-inductance and coefficient of mutual-induction. ✓ Describe transformer- step-up & step-down transformers. ✓ Describe AC Generator. ✓ Describe three phase system large Scale Power generation and distribution	9%
7. Electric circuits	7.1 Classification of substances into conductors, insulators & semiconductors. ***(Exclude Classification on the basis of conductivity)***	✓ Classify substances into conductors, insulators & semiconductors on the basis of conductivity & energy bands. ✓ Discuss effect of temperature on the resistivity of conductors, thermistors, semiconductors & superconductors ✓ Describe applications of thermistors.	14%

	7.2 Temperature dependence of resistivity. ***(Exclude the Super conductor)*** 7.3 Semiconductors 7.4 DC Circuits. ***(Exclude the Linearity, Sensitivity & resolution of a sensor in circuit)*** 7.5 AC Circuits. ***(simple treatment without derivation)*** 7.6 AC Voltage applied to a series LCR circuit	✓ Describe semiconductors-intrinsic & extrinsic semiconductors. ✓ Explain DC Circuits ✓ Describe Kirchoff's rules ✓ Describe applications of potential divider in light dependent resistors & thermistors, in audio volume controls. ✓ Explain sinusoidal variation of voltage & current in an AC circuit ✓ Explain AC circuit ✓ Describe RMS value of AC	
8. Ray Optics	8.1 Reflection of light by spherical mirrors. ***(Include only the final expression without derivation for Mirror Equation)(Exclude the sub-topic Locating images by drawing rays)*** 8.2 Refraction through spherical surfaces. 8.3 Refraction by lenses.	✓ Explain reflection of light by spherical mirrors. ✓ Describe refraction through spherical surfaces ✓ Explain cartesian sign convention for spherical surface. ✓ Describe refraction by lenses ✓ Explain converging & diverging lenses ✓ Derive and apply lens equation ✓ Explain magnification expression ✓ Explain power of a lens ✓ Describe combination of lenses in contact	10%

9. Wave optics	9.1 Wavefront. 9.2 Huygen's principle. 9.3 Refraction & reflection of plane waves using Huygen's principle. 9.4 Superposition of waves. 9.5 Interference & Young's experiment. ***(Exclude Reflection of plane wave by a plane surface, Interference by sound waves, Interference of microwaves and Water waves)*** 9.6 Diffraction. ***(Exclude the sub-topic diffraction of sound waves)***	✓ Explain wavefront & Huygen's principle ✓ Explain refraction using Huygen's principle. ✓ Describe superposition of waves ✓ Define the terms interference, coherence, path difference & phase difference. ✓ Describe Young's double slit experiment. ✓ Discuss diffraction of light and microwaves at a single slit ✓ Differentiate interference & diffraction based on intensity pattern ✓ Use of diffraction pattern from a single slit in the spectral analysis of light from stars	7%

9. Quantum Physics	10.1Particle nature of light: The photon ***(Exclude the historical development: Wein's displacement law)*** 10.2 Electron emission. ***10.3*** Photoelectric effect. ***(Simple treatment only without Hertz's observation & Hallwach's & Lenard's observation)*** 10.4 Experimental study of the photoelectric effect. 10.5 Photoelectric effect & wave theory of light. 10.6 Einstein's photoelectric equation: Energy quantum of radiation. 10.7Wave nature of matter. 10.8The quantum atom	✓ Discuss particle nature of light: The photon ✓ Calculate energy of photon in eV ✓ Discuss the photon model of electromagnetic radiation. ✓ Explain electron emission. ✓ Describe the photoelectric effect. ✓ Discuss experimental study of the photoelectric effect. ✓ Discuss photoelectric effect & wave theory of light. ✓ State the significance of the terms work function & threshold frequency. ✓ Explain Einstein's photoelectric equation & conservation of energy. ✓ Discuss wave nature of matter. ✓ Explain dual nature of radiation ✓ Explain de-Broglie matter waves. ✓ the quantum atom-Continuous, Emission & Absorption spectra	7%

11. Particle physics	11.1 Standard model. 11.2 Particles & antiparticles. 11.3 Annihilation. 11.4 Classification of particles. 11.5 Nanotechnology ***(Exclude Nanoelectronic, Nano-textiles & Nanotechnology & life sciences***)	✓ Describe particles & antiparticles. ✓ Explain annihilation of particles. ✓ Classify particles. ✓ Describe quarks & leptons. ✓ Discuss properties of quarks. ✓ Explain conservation laws regulating particles. ✓ Explain change of quarks in β+ decay & β- decay ✓ Explain nanotechnology. ✓ Discuss applications of nanotechnology & its future implications.	7%
12. Nuclear Energy	12.1 Nuclear energy ***(Simple treatment only without nuclear stability)*** 12.2 Nuclear fission: The basic process 12.3 Nuclear fusion: The basic process	✓ Explain nuclear energy. ✓ Define thermal neutrons. ✓ Describe nuclear fission. ✓ Describe occurrence of nuclear chain reaction-controlled & uncontrolled ✓ Describe nuclear fission reactor. ✓ Discuss peaceful & destructive applications of nuclear fission ✓ Describe nuclear fusion. ✓ Explain thermonuclear fusion in the Sun & other stars-CNO Cycle & P-P cycle. ***(Only the type of cycle without reaction*)** ✓ Explain controlled thermonuclear fusion. ✓ Discuss advantages of nuclear fusion as a potential energy source over nuclear fission.	7%
13. The Sun, The Earth & The Climate	13.1 Astrophysical plasma. 13.2 Sunspot cycle. 13.3 Solar Activity	✓ Describe astrophysical plasma. ✓ Explain Sunspot cycle. ✓ Explain solar dynamo. ✓ Discuss solar activities- Concepts of solar irradiance & insolation. ✓ Describe influence of solar flares & Coronal mass ejections on the Earth.	4%

Physics Practical for Class XI

Sl. No.	Experiment	Materials Required	Remarks
1.	Densities of objects	• Vernier callipers • Screw gauge • Digital balance • Glass slab • Wire • Metre rule • Magnifying glass.	
2.	Focal length of concave mirror	• A concave mirror • Mirror holder • Optical bench • Two optical pins • Two optical pin holders • Meter scale	
3.	Gravitational force	• PhET simulation software • Computer	Apparatus not required
4.	Analogue of radioactive decay	• Burette • Stop clock • Water • Beaker • A clamp • Clamp stand	

PHYSICS Practical for Class XII

Sl. No.	Experiment	Materials Required	Remarks
1.	Electromotive force of a dry cell	• 100 cm long wire mounted on a wooden board fitted with scale • Resistance box (1-10 Ω) • Ammeter (0– 1 A) • Voltmeter (0– 3 V) • One-way plug key • Connecting wires • DC source • Jockey • Galvanometer • Dry cell	Hands-on experience of concepts learnt in theory
2.	Specific resistance	• Meter bridge • Galvanometer • One-way key • DC source • Resistor of unknown resistance • Connecting wires • Sand paper • Resistance box • Screw gauge	
3.	Convex lens	• Convex lens • Two optical pins • Lens holder • Two pin holders • Optical bench	
4.	Combination of convex lenses	• Optical bench • Two convex lenses marked A and B • Two lens holders	

		• Two optical pin holders • Meter scale	
5.	Refractive index	• Travelling microscope • Water • Oil (e.g. edible refined oil, kerosene, petrol, etc.) • Thick pin • Beaker, • Saw dust • Magnifying lens	
6.	Acceleration due to gravity	• Metallic bob • Light inextensible thread • Clamp stand • Vernier callipers • A pair of split corks • Metre scale • Stop clock	

10.ECONOMICS

Subject: ECONOMICS **Class: XI**

Strand	Chapters	Scope		Weighting
		Topics/Sub topics	**Learning objectives**	
I. Understanding Economics	**Definitions of economics**	Definitions of economics: Adam Smith, Alfred Marshall, Lionel Robbins, and Samuelson.)	✓Construct the meaning of economics as defined by different economists ✓Explain the evolution of economic thoughts ✓Describe the nature and scope of economics ✓Differentiate between micro and macro economic	**47%**
	Basic concepts:	2.Utility, price, value, wealth, welfare, money, market, investment, income, Production, consumption and savings	✓Discuss the concepts such as Utility, price, value, wealth, welfare, money, market, investment, income, Production, consumption and savings	
	Basic problems of economy:	What to produce, how to produce and for whom to produce.	✓Explain the causes of basic economic problem	
		2.Efficient use of resources.	✓Explain efficient use of resources	
		Economic growth and development	✓Discuss the concept of economic growth and development.	
			✓Differentiate the economic growth and development.	
			✓Explain Production Possibility curve with the help of a graph and schedule.	
	Types of economies	Developed, under-developed and developing economies;	✓Describe the concept of Developed, under-developed and developing economies.	
			✓Differentiate between developed, developing and under-developed economies	
		Capitalism, socialism, and mixed economies	✓Discuss capitalistic, socialistic and mixed economic system	
			✓Explain merits and demerits of each system	
			✓Compare and contrast between different economic system	
			✓Provide solution to basic problems faced by each economy	

II. Bhutanese Economy	Introduction to Bhutanese Economics	Bhutanese Economy as a mixed and planned economy.	✓Give the meaning of mixed economy	**10%**
			✓Explain the features of Bhutanese economy as a mixed economy	
		Bhutanese Economy as a planned economy.	✓Give the meaning of planned economy.	
			✓Explain the features of Bhutanese economy as a planned economy	
	Unemployment in Bhutan	Meaning of unemployment.	✓Define the meaning of unemployment	
		Nature and extent of unemployment problem in Bhutan.	✓Discuss the nature and extend of unemployment in Bhutan	
		Consequences of unemployment problem.	✓Discuss the effects of unemployment on Bhutanese economy	
		Remedial measures taken in the Bhutanese economy.	✓Suggest remedial measures to address the unemployment problem	
	Poverty	Meaning of Poverty.	✓Explain the meaning of Poverty.	
		Concept of Poverty in Bhutanese context.	✓Define the concept of poverty in context to Bhutan	
		Measures taken to remove poverty in Bhutan.	✓Analyze the causes and extent of poverty in Bhutan	
			✓Suggest measures to reduce the extent of poverty.	
	Service sector in Bhutan	Tourism and its importance.	✓Discuss the importance of tourism as a service sector to the Bhutanese economy	
	Human resources development in Bhutan	Significance of human resource development.	✓Explain the Significance of human resource to the economy.	
		Components of human resource development (Education and health)	✓Discuss health as one of the Components of human resource development	
			✓Discuss education as one of the Components of human resource development	
III. Money and Banking	Money	Meaning of money	✓Define the meaning of money.	**30%**
		Functions of money	✓Describe the functions of money	

			✓Explain major short comings of barter system	
	Banks	Functions of commercial banks	✓Explain the Functions of commercial banks	
			✓Differentiate between banking and non-banking financial institutions.	
		Credit creation by commercial banks.	✓Critically evaluate the process of credit creation by commercial banks	
	Royal Monetary Authority of Bhutan	Functions of RMA	✓Discuss the function of RMA as the central bank of Bhutan.	
			✓Differentiate between the functions of central bank and commercial banks.	
	Inflation	Causes of inflation	✓Examine the causes of inflation	
		Types of inflation	✓Explain the types of inflation	
		Effects of inflation on different groups of society	✓Discuss the effects of inflation on different group of society.	
		Measures to control inflation	✓Describe the measures to control inflation	
		Inflation in Bhutan.	✓Analyze inflation situation in Bhutan.	
IV. Statistics	Statistics	Definition and scope	✓Define statistics	**13%**
			✓Derive the scope of statistics.	
		Limitations of statistics	✓Analyze the limitations of statistics	
	Index numbers	Simple and weighted	✓Define the term index number.	
			✓Analyze and interpret on the different methods of constructing index number.	
			✓Compute indices to measure changes in price and quantity over time.	
				100

Subject: ECONOMICS **Class: XII**

Strand	Chapters	Scope		Weighting
		TOPICS/SUB TOPICS	**Learning Objectives**	
UNIT I -	Theory of Demand	Meaning; law of demand; derivation of demand curve; movement & shift of demand curve; determinants of demand; exception to the law of demand; indifference curve analysis: meaning, indifference curve & map; marginal rate of substitution, properties of indifferences curve, budget line(meaning only); comparison of utility analysis & indifference curve analysis	✓ Explain the factors affecting demand ✓ Differentiate between shifts in demand curve and movement along the demand curve ✓ Explain law of Demand & exception to the Law of demand ✓ Explain the properties of indifference curve ✓ Derive the meaning of budget line with the help of illustration ✓ Explain consumer's equilibrium with reference to indifference curve analysis ✓ Compare and contrast between utility approach and indifference curve analysis	39%
	Elasticity of Demand	Meaning; types of elasticity of demand; measurement of elasticity of demand; factors affecting elasticity of demand; importance of the concept of elasticity	✓ Explain the types of price elasticity of demand ✓ Explain the determinant of Elasticity of Demand ✓ Explain the importance of Elasticity ✓ Calculate price elasticity of demand using different methods	
	Supply	Meaning; difference between stock & supply, time period & supply; law of supply; movement & shift of the supply curve; determinants of supply; elasticity of supply.	✓Differentiate between stock and supply ✓Explain the relation between time period and supply ✓Explain the factors affecting supply ✓Explain the law of supply and its exceptions ✓Explain types of price elasticity of supply ✓Calculate price elasticity of supply using different methods ✓Differentiate between shifts in supply curve and movement along the supply curve	

	Concept of Product & Production Function	returns to a factor, total, average & marginal physical products; law of variable proportion & its three stages; return to scale.	✓ Define Production Function ✓Differentiate between short run & long rung production function ✓Explain the concept of Total product (TP), Average Product (AP) and Marginal Product (MP) ✓Explain law of variable proportion & Law of returns to scale with diagram ✓Compare and contrast between Law of variable proportion & Law of return to scale	
	Equilibrium Price	Basic concepts: equilibrium & equilibrium price Equilibrium price and quantity under perfect competition; price determination Effects of shift in demand and supply; equilibrium price and equilibrium quantity Effects of simultaneous shift in demand and supply	✓ Explain concepts such as equilibrium, equilibrium price and quantity ✓ Explain equilibrium price and quantity under perfect competition with the help of diagram ✓ Explain effects of shift in demand and supply on equilibrium price and quantity using diagrams ✓ Explain effects of simultaneous shift in demand and supply using diagrams	
	Revenue & Cost	Meaning of total, average & marginal revenue. relationship between AR & MR under perfect, imperfect competition & monopoly. fixed & variable cost. total, average & marginal cost & their relationship. definition & application opportunity cost; explicit & implicit cost: short run & long run cost curve; internal & external economies, equilibrium of the firm	✓Explain opportunity cost and its application ✓Critically analyze the behavior of cost in the short-run and long-run ✓Distinguish between fixed cost and variable cost ✓Distinguish between explicit cost and implicit cost ✓Explain behavior of costs under short and long run with diagrams ✓Elaborate on the relationship between fixed, variable, total, average and marginal Cost ✓Explain internal and external economies of scale ✓Explain total, average and marginal revenue ✓Explain the relationship between average and marginal revenue under perfect and imperfect competition with diagrams	
UNIT II	National Income	National income: meaning	✓Explain the meaning of national income	9%
		circular flow of income: four sector model	✓Explain the meaning of Circular Flow of Income 2. explain circular flow of income in four sector model.	

UNIT III	Trade	Meaning of trade Need for trade Basis of trade: absolute and comparative cost theory	✓Explain the meaning & need for Trade. ✓Discuss the Basis of International Trade using Absolute & Comparative Cost Theory	19%
		Balance of payments(balance of trade: meaning & causes of disequilibrium in the bop; measures to correct disequilibrium in b.o.p	✓Explain the Balance of Payment. ✓Explain the causes of Disequilibrium in the balance of Payment. ✓Examine the measures to correct the disequilibrium in the balance of payment.	
UNIT IV	Public Finance			33%
	Public Revenue:	Meaning & types of taxes in Bhutan,	✓Give the meaning of public revenue.	
		Direct & indirect taxes: merits & demerits	✓List down different sources of revenue	
		Sources of government revenue	✓Define tax ✓Explain direct and indirect taxes. ✓Discuss merits and demerits of direct and indirect taxes.	
	Public Expenditure	Meaning & growth of public expenditure in Bhutan.	✓Give the meaning of public expenditure. ✓Inquire into trend of current and capital expenditure in Bhutan and its implication on the economy ✓Explain the reasons for the rise in public expenditure in recent times in Bhutan	
	Public Debt	Meaning of public debt.	✓Define public debt.	
		Reasons for external & internal borrowing by the government	✓Give the reasons for external and internal borrowing by government.	
		Effect of borrowing on the Bhutanese economy	✓Evaluate the trend of debt in Bhutan and its impact on Bhutanese economy.	
	Fiscal Policy	fiscal policy in relation to objectives of equality, stability & growth.	✓ Define fiscal policy ✓ Elaborate on the objectives of fiscal policy Evaluate how fiscal policy helps in achieving national objectives of equity, stability and economic growth	

	Deficit Financing	Reason for deficit financing	✓Explain deficit financing ✓ Discuss reasons for deficit Financing	
		Methods of deficit financing.	✓Explore methods of deficit Financing	
	Budget	Needs for budget.	✓ Explain the need for Budget	
		Types of budget	Explain the types of Budget in context to Bhutan	
			Total	**100%**

11.ENVIRONMENTAL SCIENCE

Subject: ENVIRONMENTAL SCIENCE **Class XI**

Strand	**Chapter title and No**	**Scope**		**Weighting**
		Topic/ Subtopic	**Learning Objectives**	
Strand 1. Systems in Nature: The basic understanding of ecosystem is achieved by learning about its components, such as the subsystems of the Earth, the distribution of flora and fauna in various geographical areas of the Earth, and also through the understanding of how these species adapt to their environment.	1. Structures and Functions of Ecosystem	1. Spheres of the earth (atmosphere, hydrosphere, lithosphere and biosphere), 2. Biomes (terrestrial biomes), 3. Ecosystems (ecosystems in Bhutan) and 4. adaptation (Types)	• Explain the characteristic features of spheres of the Earth. • Explain the characteristics of biomes. • Discuss the factors that determine the distribution of biomes. • Describe ecosystems in Bhutan and their characteristics. • Describe adaptation in plants and animals.	5
Strand 1. Systems in Nature: This concept of maintaining homeostasis in nature is described by the energy flow in the ecosystem, nutrient cycling and also by understanding the influence of symbiotic relationships between the species on the carrying capacity of the environment.	2. Balance in Nature	1.Energy flow in an ecosystem (a. feeding relationship, b. ecological pyramid), 2.Biogeochemical cycle (a. Atmospheric cycle, b. Edaphic nutrient cycle), 3.Carrying capacity of an ecosystem (a. interaction among species and carrying capacity)	• Distinguish between grazing and detritus food chains. • Differentiate between different types of ecological pyramids. • Explain biogeochemical cycles with illustrations. • explain that the biogeochemical cycles are affected by anthropogenic activities. • Explain carrying capacity of the ecosystem. • Relate carrying capacity with the availability of resources. • Explain the influence of symbiotic relationships among the species on the carrying capacity.	10

Strand 1. Systems in Nature: The natural world in its normal state coexists with humans and other living things. Therefore, the interdependence of humans and environment is conceptualised by the processes of coadaptation and coevolution.	3. People and Environment	2. Interdependence of humans and environment (coadaptation and coevolution, human societies and ecosystem: The changing relations)	• Explain coevolution and coadaptation • Analyse how human interactions modify ecosystems and environment. • Evaluate the changing relationship of humans with the environment.	4
Strand 2. Environmental Issues and Concerns: Population explosion and increase in purchasing power parity has led to a change in lifestyle. This has put tremendous pressure on the natural resources. The impact of such change in lifestyle is inevitable. Thus, it has to be discussed through the study of Ecological Footprint.	4. Natural Resources Degradation	1. Natural resources and its exploitation (a. land, water and forest resources) b.Overexploitation of natural resources (carrying capacity and Ecological Footprint)	• Explain natural resource exploitation and its impacts. • Explain the factors that cause over-exploitation of natural resources. • Describe the impact of over-exploitation of natural resources on carrying capacity of the ecosystem. • Explain Ecological Footprint.	5
Strand 2. Environmental Issues and Concerns: Irreversible pollution is induced and facilitated by anthropogenic activities through different means that cause adverse effects on humans and other living organisms.	5. Pollution	1. Natural resources and its pollution (Air pollution, Water pollution, Land pollution), 2. Chemical pollutants and toxicity (toxic and hazardous substances, measuring toxicity) 3. Health hazards of toxic substances (route of exposure and susceptibility to toxic substances, impacts of toxic substances on the	• Explain air, water and land pollution. • Explain the causes of pollution. • Describe different types of pollutants and their sources. • Evaluate the effects of pollution on human and environment • Define toxin, toxicology and toxicity. • Explain the various ways to measure toxicity. • Explain the mechanisms of minimising the toxic effects of chemical pollutants.	9

		human health and environment, ways to minimise the toxic effects of chemical pollutants)	• Explain the routes of exposure and susceptibility to toxic substances to humans.	
Strand 2. Environmental Issues and Concerns: Climate change caused by global warming is inevitably a global concern for the world.	6. Climate Change	1. The climate system (what is climate?, components of climate system) 2. Climate change (what is climate change?, impact of climate change) 3. Phenology and climate change (what is phenology?, phenophase definition and identification, phenophase observation and recording, network of phenology)	• Define the climate system. • Explain the mechanism of climate feedback. • Define climate change. • Justify global warming as the effect of anthropogenic activities. • Explain the factors responsible for climate change. • Explain the impact of global warming on climate change • Evaluate the impacts of climate change on biodiversity, water resources, agriculture, and human health. • Evaluate the relationship between phenology and climate variables.	9
Strand 2. Environmental Issues and Concerns: Disaster risk reduction aims to reduce socio-economic vulnerabilities to disaster as well as in dealing with the environmental and other hazards that trigger them.	7. Disaster and Environment	1. Hazards and Disasters (types of Hazards, impacts of hazards) 2. Disaster Reduction (Disaster monitoring tools, understanding GLOF mitigation)	• List types of hazards and their causes. • Explain the impacts of various types of hazards on the socio-economic structure and environment • Discuss the instruments and technological innovations that help reduce disaster. • Analyse the mitigation strategies of GLOF in Bhutan	6

Strand 3. Natural Resource Management: The health of an ecosystem is assessed by measuring biodiversity at genetic, species and ecosystem levels.	8. Biodiversity and Measurement	1.Biodiversity and Ecosystem Services (Biodiversity, Levels of biodiversity, Patterns of biodiversity values of biodiversity) 2.Measuring biodiversity (measuring three levels of biodiversity, Measurement of ecosystem diversity, Measurement of genetic diversity)	• Explain biodiversity. • Describe the levels of biodiversity. • Explain the importance of biodiversity. • Describe the relationship of biodiversity with ecosystem services. • Explain diversity indices. • Measure biodiversity using diversity indices.	15
Strand 3. Natural Resource Management: Owing to the threats to biodiversity, conservation efforts in Bhutan are governed by acts and policies, traditional belief systems which have been effective till now.	9. Biodiversity Conservation	1. Threats to biodiversity (causes of biodiversity loss, Biodiversity loss is a concern) 2. Conservation of biodiversity (Biodiversity conservation, Biodiversity conservation programmes in Bhutan)	• State some of the factors that cause biodiversity loss. • Describe the consequences of biodiversity loss. • Explain in-situ conservation and ex-situ conservation. • Describe conservation initiatives in Bhutan.	5
Strand 3. Natural Resource Management: For sustainable agriculture, land and water resource management is adopted for long term perspective.	10. Water and Land Management	1. Water conservation (Water conservation initiatives in Bhutan) 2. Water quality (water quality test-omit practical part on water quality test) 3. Land waste management (Land waste, Land waste management, E-waste)	• Explain water conservation efforts of Bhutan. • Explain the importance of watershed management for water conservation • Explain the concept of water quality. • Explain the ambient water quality parameters, standards and significance. • Explain the importance of chemical oxygen demand in terms of water quality.	9

			• Explain the importance of chemical oxygen demand in terms of water quality (skip the practical component). • Define land waste management • Explain waste management hierarchy. • Explain the various methods of waste management • Explain the health impacts of e-waste.	
Strand 3. Natural Resource Management: Energy efficiency and management can serve as a stepping stone for ensuring green growth, eco-efficiency, and sustainable development.	11. Energy Conservation	1. Energy sources, production and uses (sources of energy) 2. Energy management and efficiency (Energy efficiency, Energy Management System)	• Identify different sources of energy. • Explain energy efficiency. • Identify the ways to improve the energy efficiency at home. • Discuss steps of Energy Management System (omit benefits of energy conservation).	5
Strand 4. Sustainable Development: Environmental impact is any positive or negative change in environmental quality resulting from human interference in the pursuit of socioeconomic development.	12. Development and Environment	1. Development (What is development?, Development indicators, Limitations of development indicators) 2. Relationship-Development and Environment (Economic growth and environment, impact of economic development on environment)	• Explain the term development • Discuss various dimensions of development. • Identify the indicators of development and their limitations. • Draw links between environment and development.	7
Strand 4. Sustainable Development: There are many conceptualisations about development.	13. Sustainable Development	1. Introduction to sustainable development (Understanding sustainable development,	• Explain sustainable development. • Explain the inter-relationship among the dimensions of sustainable development.	11

Relentless pursuit of growth in GDP has repercussions, particularly on social wellbeing and the environment. Sustainable development paradigms are taking hold in international debates particularly GNH.		dimensions of sustainable development) 2. Relationship-Development and Environment (Economic instruments, Types of economic instruments) 3. GNH and sustainable development (Gross National Happiness and its dimensions, Sustainable environmental policies and strategies of Bhutan)	• Describe the types of economic instruments for environmental protection and resource management. • Discuss sustainable development in context of GNH. • Analyse the developmental policies and strategies of Bhutan from the point of sustainable development • Analyse the challenges of GNH practices for sustainable development.	

Subject: ENVIRONMENTAL SCIENCE **Class: XII**

Strand/ Fundamental concept	Chapter Title and No.	Scope		Weightage
		Topic/ Sub-Topic	Learning Objectives	
1. Systems in Nature: Ecological communities and Ecosystem services valuation.	**CHAPTER 1:**	**STRUCTURE AND FUNCTIONS OF ECOSYSTEM**	• Distinguish between major and minor communities. • Explain some characteristics of a community. • Describe ecosystem services in relation to Bhutan's rich biodiversity. • Appreciate the importance of ecosystem services for the well-being of Bhutanese people. • Discuss various methods of ecosystem services valuation. • Relate the importance of ecosystem services valuation in the conservation of ecosystem.	9
1. Systems in Nature: The classification and processes of ecological succession.	**Chapter 2**	**BALANCE IN NATURE**	•Describe succession caused by natural and anthropogenic disturbances. •Explain the causes of ecological succession. •Explain the evolution of a plant community (steps of ecological succession). •Describe the kinds of ecological succession. •Explain the significance of ecological succession in an ecosystem.	7
1. Systems in Nature: Impact of human activities on nature and its measurement.	**Chapter 3**	**PEOPLE AND ENVIRONMENT**	▪ Measure ecological footprint. ▪ Relate ecological footprint with sustainable development.	7

			▪ Discuss environmental impact of urbanization. ▪ Map the location of industrial plants in Bhutan and evaluate their suitability.	
2. Environment issues and concerns: Environmental degradation through aspects, such as depletion of natural resources caused directly or indirectly by anthropogenic activities has major implications on the environment and wellbeing of all living organisms.	**Chapter 4**	**NATURAL RESOURCE DEGRADATION**	• Describe the phenomenon of land degradation. • Explain the processes that lead to degradation of land. • Explain the major causes of land degradation. • Analyse the social, economic and environmental impacts of land degradation. • Discuss fresh water availability, accessibility and equitable distribution. • Assess the issues of over-utilization of groundwater. • Explain the impacts of contaminated ground water on the ecosystem.	9
2. Environment issues and concerns: Control of pollution involves measures, such as social decisions, legal instruments and technological innovations.	**Chapter 5**	**POLLUTION**	• Assess the quality of air using the air quality index. • Discuss technologies used for reduction of greenhouse gas emission and pollution. • Explore the technologies for reusing and recycling wastes.	7

			• Explain biological pollutants and their effects. • Discuss environmental pollution caused by genetically modified organisms (GMOs).	
2. Environment issues and concerns: Climate change is a global phenomenon influencing the national economic and political decisions and enhancing a number of mitigation and adaptation initiatives.	**Chapter 6**	**CLIMATE CHANGE**	• Explain mitigation and adaptation based on IPCC and UNFCCC. • Describe some of the mitigation measures for climate change in Bhutan. • Analyse the vulnerability assessment of climate change. • Determine the impacts of climate change and suggest adaptive measures. • 6. Use relevant tools and techniques to carry out phenology and climate data analysis.	8
3. Natural resource management: Environmental degradation and disasters are inextricably linked. Since we are already experiencing disasters related to the environment, disaster risk management, to contain the effects of disasters, has come into effect.	**Chapter 7**	**DISASTER MANAGEMENT**	• Describe the disaster management cycle. • Explain mitigation and the ways by which it reduces risk. • Explain measures to achieve disaster-resilient community. • Describe international initiatives on disaster management. • Describe national disaster management policies. • Explain disaster management practices in Bhutan.	12

3. Natural resource management: Human activities contributing to the negative impact on biodiversity have gained global attention.	**Chapter 8**	**BIODIVERSITY CONSERVATION**	• Explain the role of biodiversity in the functioning of the ecosystem. • Explain endemism with some examples. • Examine roles of international treaties and conventions for the conservation of biodiversity.	4
3. Natural resource management: Owing to the threats to biodiversity, conservation efforts in Bhutan are governed by acts and policies, traditional belief systems which have been effective till now.	**Chapter 9**	**BIODIVERSITY MANAGEMENT**	• Describe the measures to promote biodiversity conservation in Bhutan. • Explain the importance of indigenous methods in biodiversity management. • Explain National Biodiversity Strategies and Action Plan (NBSAP). • Interpret the application of Biodiversity Management System (BMS) in biodiversity conservation. • Explain some of the challenges in biodiversity management. • Investigate the causes of human-wildlife conflict.	8
3. Natural resource management: For sustainable agriculture, land and water resource management is adopted for long term	**Chapter 10**	**LAND AND WATER MANAGEMENT**	• Explain land use and land cover change. • Explain the sustainable land management approach and practices in Bhutan.	9

perspective.			• Evaluate the soil quality standards for agriculture. • Carry out the soil test. • Explain the importance of water management in agriculture. • Identify various water conservation approaches in agriculture systems. • Explain the technique of rain water harvesting. • Describe the types of irrigation techniques. • Relate the biological and chemical content of water to its quality. • Explain the importance of biological oxygen demand in relation to water quality.	
3. Natural resource management: Energy is the key driver of economic growth. However, the sources which facilitates the production of energy is contended in light of climate change and its associated impact. Therefore the move towards green energy.	**Chapter 11**	**ENERGY CONSERVATION**	• Explain alternative energy devices. • Evaluate pros and cons of alternative energy devices. • Describe the green technologies for energy efficiency.	6

4. Sustainable development:	**Chapter 12**	**ENVIRONMENT MANAGEMENT**	• Explain the green economy. • Discuss green economy practices in various sectors. • Explain environmental management systems in the context of sustainable development. • Identify tools for sustainable environmental management.	10
4. Sustainable development: The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all.	**Chapter 13**	**SUSTAINABLE DEVELOPMENT**	• Identify sustainable development goals. • Identify challenges for Bhutan in achieving SDGs.	5

12.GEOGRAPHY

Subject: GEOGRAPHY **Class XI**

Strand	Chapter	Scope		Weighting
		Topic/ sub topics.	Learning objectives	
Physical environment	**Structure and composition of the Earth**	*Earth's interior /structure, Earth's density/ temperature, Earth's pressure and Earthquakes waves and their characteristics.*	Explain the structure and composition of the Earth Elaborate the origin of earthquake and its waves.	4
	Rocks	*Rocks and minerals, Classification of rocks and their characteristics, Economic importance of each rocks and Rock cycle.*	Classify rocks with their characteristics Describe rock cycle. Explain the economic importance of rocks	4
	Soils	*Soil profile; properties of soil; factors of soil formation; soil classification;*	Illustrate the soil profile and explain the factors affecting soil formation.	4
	Endogenetic processes and its effect on the on the surface	*Endogenetic forces- Diastrophism and sudden force; Diastrophism- folding and faulting; land forms associated with edogeneous processes- mountains, plateaus and plains and their classification*	Explain the causes and effect of endogenetic forces that have carved varied landscape on the Earth's surface.	4
	Work of Glacier	*Movement of Glaciers, Types of Glaciers and Landforms associated with Glacier*	Explain the work of glacier in the formation of various landforms.	4
	Composition and structure of the Atmosphere	*Heat budget of the earth, latitudinal heat balance, factors affecting solar radiation, Heating and cooling of the atmosphere, Horizontal Distribution of temperature and inversion of temperature*	Explain the composition and structure of the atmosphere Explain the factors affecting solar radiation and temperature distribution. Discuss the importance of atmosphere	5
	Importance of the atmosphere			2
	Insolation and temperature			5
	Atmospheric pressure and winds	*Factors affecting atmospheric pressure, Horizontal and seasonal distribution of atmospheric pressure, Types of winds moisture in*	Explain the factors affecting atmospheric pressure	5

		the atmospheres , forms of condensation and precipitation: types, classification and distribution of rainfall	Describe the types and classification of rainfall Elaborate the types of wind moisture in the atmosphere Explain the horizontal and seasonal distribution of atmospheric pressure.	
	World climatic types	*Climatic change and Koeppen's classification of climate*	Discuss the causes and impacts of climate change Elucidate the classification of climate.	5
	Natural Hazards their causes and management	*Introduction and definition; Earthquakes, volcanic, flood, landslide, forest fires, drought, epidemics and traffic hazards; Disaster management cycles; International Decade for natural disaster Reduction*	Explain the various types of hazards and disasters Discuss causes and effect of disasters Suggest measures to mitigate disasters	11
	Remote sensing(Refer supplementary text)	*What is remote sensing, uses, interpretation and analysis,* (*What is remote sensing, uses, interpretation and analysis,)*	Explain remote sensing Discuss the application of remote sensing.	4
	Map work	*On the outline map of the world; locating and labeling for examinations some aspects like physical features, climatic regions and vegetation from the text book.*	Locate the climate features, climate region and vegetation on the outline map of world	2
	Map projections (practical)	*Cylindrical equal area* *Simple conical with one standard parallel* *Zenithal equidistant*	Explain the importance different map projections Illustrate the map projection.	6

Subject: GEOGRAPHY **Class XII**

Strand	Chapter	Scope		Weighting
		Topic/ sub topics.	**Learning objectives**	
People and environment	**Population**	• Population structure and composition • Distribution of population in Bhutan. • Density of population. • Growth of population • Factors affecting growth of population • Migration; Causes of migration, consequences and trends of migration in Bhutan. • Sources of population data and their importance.	**By the end of the lesson student will be able;** ✓ To explain population structure and composition ✓ To explain the factors affecting density and distribution of population. ✓ To interpret and compare population pyramid of developed and developing countries. ✓ To calculate population density and growth rate of population. ✓ To explain the causes and consequences of migration ✓ Explain the fundamental sources of population data.	7
	Settlement	• Types of settlements; Rural and urban • Factor determining the type of rural settlements; • Urbanization and major urban centers of Bhutan, Urban classification based on size; Conurbation; Concentric zone theory; impacts of Urbanisation	**By the end of the lesson student will be able;** ✓ To distinguish between urban and rural settlement ✓ To describe the types and pattern of rural settlement ✓ To explain the rate of urbanization ✓ To elaborate the factors affecting rural and urban settlement ✓ To examine the impacts of Urbanisation.	7
	Energy Resources	• Energy sources, Conventional Sources • Hydro Electric Projects (HEP), • Impacts of HEP • Non-conventional sources of energy	✓ To distinguish renewable energy from non-renewable energy ✓ To Explain the importance of HEP. ✓ To compare the conventional and non-conventional sources of energy.	3

	Industrial resources	• Traditional and modern industries • Major industries and industrial development in Bhutan • Factors affecting localization of industries. • Types of industries. • Impacts of industrial development	✓ To distinguish modern industries from traditional industries. ✓ To describe the factors affecting the location of industries. ✓ To locate major industries in the outline map of Bhutan ✓ To explain the types of industries. ✓ To examine the impacts of industrial development	3
	Agriculture and livestock	**Agriculture**; Wet and dry agriculture; Crop Rotation, Crop combination and Intensity of cropping. Subsistence and commercial farming Problems of Bhutanese agriculture. Use of technology in agriculture. **Livestock rearing and its important**	✓ To distinguish between wet and dry agriculture. ✓ Explain the factors affecting the intensity of cropping. ✓ Compare and contrast subsistence and commercial farming ✓ Suggest measure to combat agricultural challenges ✓ Explain the role of livestock in Bhutanese economy	5
	Transport	• History of transport system in Bhutan. • Mode of transport • Factors affecting different modes of transport. • Significance and challenges of different modes of transport.	✓ To explain the development of transport system in Bhutan ✓ To explain the types of transport system. ✓ To elaborate the merits and demerit of road and air transport. ✓ To explain the factors affecting the road and air transport. ✓ To explain the significance and challenges of road and air transport.	6
	Communication	• History of Communication in Bhutan; Postal Service-Mail system, Money order and Post Office • computerization; Telecommunication- Fax,	✓ To explain the development of communication system. ✓ To explain the means of communication in Bhutan.	

		Telegraph, Telephone and Mobile service; Mass • communication – Kuensel, Bhutan Broadcasting Service, Bhutan Television Service, Cinema, • Tshechus, Emails and internet; Importance of infrastructure as key to development of industrial economy)	✓ To compare and contrast between print and digital means of communication. ✓ To examine the role of transport and communication in the economic development.	6
	Nature Conservation	• Concept of Conservation • Concept of sustainable development • Environmental impact assessment. • Bhutan's heritage • Preservation of Bhutan's heritage, • Environmental challenges. • Government policies and initiatives.	✓ Explain sustainable development ✓ Explain the importance of nature conservation ✓ Explain the importance of Environmental Impact Assessment ✓ To explain the factors that had helped to protect the environment in Bhutan ✓ To suggest measures to overcome environmental challenges.	8
Time and space	**Map reading and interpretation**	**Drawing of scales** (Linear, graphic scales representative fractions and statement of scale methods.) **Drawing of cross section or profiles of important contour** *Ridge, plateau, escarpment, valley, conical hill, types of slope waterfalls, spurs by using vertical exaggeration and horizontal equivalent.* **Map reading and interpretation of survey of Bhutan maps** Study will be based on representative portion of any three topographical sheets. It will include the	✓ To explain the importance of expression of scales. ✓ To convert and construct scales ✓ To draw and interpret profiles with help of contours ✓ To identify and interpret topographical maps. ✓ To explain the types and importance of surveying	**20**

		description of location, extent, relief features drainage, land use, settlement patterns, communications and inferences about human occupations and stage of economic development of the area.) **Surveying** (Importance of Surveying, types of survey, Plane table survey, method of plane table survey, preparing two plans of the school compound or a small area using Plane Table survey method.) **Project**		

13.HISTORY

Subject: Bhutan Civics **Class: XI**

Strand	Chapter	Scope		Weighting (%)
		Topic/sub-topics	**Learning objectives**	
Governance and Peace	Society, State and Nation	State Society Nation Government Sovereignty Territory	Discuss the term Society, State and Nation Identify the attributes of Society, State. Nation and Government Differentiate between State and Nation Discuss Aristotelian Classification of Government	5
	Forms of Government	Aristotelian Classification of Government Forms of Modern Government	Explain the types of democratic government Identify the merits and demerits of democratic government Describe classification of constitution	5
	Constitution	Types of Constitution Features of Good Constitution Bhutanese Constitution	Elucidate merits and demerits of different types of constitution Explain features of good constitution Evaluate constitution of Bhutan	5
			Total	**15**

Subject: Bhutan History **Class: XI**

Strand	Chapter	Scope		Weighting (%)
		Topic/sub-topics	Learning objectives	
Identity, Spirituality and Culture	Culture and Heritage	Zorig Chusum : The Thirteen Traditional Crafts	Explain the concept of cultural heritage. Explain tangible and intangible cultural heritage with Bhutanese examples. Evaluate the significance of major factors that shaped the Bhutanese culture	10
	Emergence of Drukpa Kagyud	Bhutanese literature Theravada, Mahayana and Vajrayana The Pioneers of Kagyed and Drukpa Kagyud Traditions of Buddhism	Discuss literature Analyze the challenges in the preservation of Bhutanese literature Describe Theravada, Mahayana and Vajrayana Discuss distinct characteristics of the Theravada, Mahayana and Vajrayana Discuss Kagyud tradition of Buddhism in Bhutan Analyze Kagyud in relation with Drukpa Kagyud tradition in Bhutan	15
			Total	**25**

Subject: World History **Class: XI**

Strand	Chapter	Scope		Weighting (%)
		Topic/sub-topics	**Learning objectives**	
Historiography	Nil	Definitions of History and Historiography Sources Oral History	Discuss the nature and scope of history Debate history as distinct discipline Describe the importance and types of sources Explain Oral History Reason out Oral History as one of the important means of constructing knowledge Distinguish between oral history and hearsay	20
Evolving Civilization	Nil	Evolution Egyptian civilization	Explain Lamarck's theory and Darwin's theory Discuss Lamarck's theory and Darwin's theory leading to biological evolution Discuss the features of Egyptian civilization in relation to the features of modern society	15
Governance and Peace		French Revolution World War I Industrial Revolution	Analyze and assess the influence of enlightenment ideas on French revolution Examine the causes of French Revolution and its impact in Europe and the World Discuss the causes the consequences of WWI Evaluate the impact of Industrial Revolution on modern democracy	15
Identity, Spirituality and Culture		Asoka	Explain Spirituality and Religion Describe early life of Emperor Asoka Explain Asoka's rise to power Describe battle of Kalinga and its impact Analyze Asoka's contribution in the spread of Buddhism in Asia Discuss the role of king Asoka in spread of Buddhism in Bhutan	10
			Total	**60**

Subject: Bhutan Civics **Class: XII**

Strand	Chapter	Scope		Weighting (%)
		Topic/sub-topics	**Learning objectives**	
Governance and Peace	Role of the Monarch in the Democratic Constitutional Monarchy	The Role of the Monarch in a Democratic Constitutional Monarchy Ascension to the Golden Thro	Discuss the role of Monarchy as symbol of unity of the Nation Discuss the ascension to the Throne Examine the Council of Regency and the Privy Council and their functions	**5**
	The Prime Minister and the Council of Ministers	The Prime Minister, Appointment , Term of Office, Powers and Functions, The Council of Ministers (Lhengye Zhungtshog), Appointment and Composition of the Council of Ministers, Term of Office, Powers and Functions of the Council of Ministers) Prime Minister The Council of Ministers	Explain the appointment, position and power of the Prime Minister Analyze the significant responsibility of the Council of Ministers in ensuring the Security of the Nation and wellbeing of the people Explain the meaning of Principles of State Policy Differentiate between Fundamental Rights and Principles of State Policy Identify different categories of Principles of State Policy	4

	Principles of State Policy	Principles of State Policy Civil Service in a Democratic Constitutional Monarchy	State the advantages of having the Principles of State Policy Explain the features of Bureaucracy Examine the role of Bureaucracy in a Democratic Nation	4 2
			Total	**15**

Subject: Bhutan History **Class: XII**

Strand	Chapter	Scope		Weighting (%)
		Topic/sub-topics	Learning objectives	
Governance and Peace	**UNIT ONE: EMERGENCE OF A NATIONA STATE** The Emergence of a Nation State	Chapter 1: The Era of Zhabdrung and the Desis (Contributions of Zhabdrung; Modalities of becoming a Desi; Contributions of the Desis.) Chapter 2: The Establishment of Hereditary Monarchy. Paving the path to the Hereditary Monarchy. Contributions of of Lam Jangchub Tsondrue. The Last Civil War Events leading to December 17, 1907). Chapter 3: The Period of Consolidation. (Possible challenge to the Right to the Throne; The Indo-Bhutanese Treaty; Socio-cultural and economic as well as political reforms till 1972. Chapter 1: Druk Gyalpo Jigme Singye Wangchuck and the Reforms	Discuss Zhabdrung Ngawang Namgyal as the architect of Bhutan as a nation state. Discuss the establishment of Hereditary Monarchy. with reference to the contributions of Jigme Namgyel. Explain the role of Lam Jangchub Tsondrue. Explain the significanace of Last Civil War Discuss he role of Ugyen Wangchuck and the event leading the establishment of Hereditary Monarchy. Describe the Period of Consolidation. Explain the significance of the The Indo- Bhutanese Treaty.	12

	Unit Two: EMERGANECE OF MODERN BHUTAN		Discuss the Socio-economic, political and cultural reforms till 1972. Explain His Majesty Druk Gyalpo Jigme Wangchuck as the consolidator in an era of internal and external turmoil. Discuss King Jigme Singye Wangchuck as the Visionary Monarch	8
	Unit Three: Gross National Happiness	Gross National Happiness	Discuss Gross National Happiness	5
			Total	25

Subject: World History **Class: XII**

Strand	Chapter	Scope		Weighting (%)
		Topic/sub-topics	**Learning objectives**	
Historiography	Nil	Sources Schools of the 19th century (Romanticism and Positivism) Schools of the 20th century (Marxism, Annals School Historiography and Post modernism) Theories	Explain the differences in interpretation of sources by different schools during the late 19th century. Explain the ideas, influence and criticism Explain the differences in interpretation of sources by different schools during the 19th century Explain the ideas, influence and criticism Explain the differences in interpretation of sources by different schools during the 20th century Compare the different theories on the role of history forwarded by Historicists, Accidentalist, Intentionalist and Hegelian.	20
Evolving Civilization	Nil	Classical Civilization. Modern civilization Humanism	Discuss the importance and impact of Greek, Roman and Mesopotamian civilization Examine modern civilization in relation with Age of Reason and Discovery Explain the role of Humanism in bringing intellectual development	15
Governance and Peace		Russian Revolution Mahatma Gandhi Preconditions of WWII Cold war	Discuss the causes and contribution of Russian Revolution Discuss early life of Gandhi and the reasons to join Indian freedom movement Discuss the philosophy of Gandhi Describe the various movements led by Gandhi Justify Gandhi as 'Father of Nation'	15

		UN and Global Peace SAARC BRICS	Assess the treaty of Versailles as cause to rise of extreme nationalism in Germany and Italy Explain the cause and consequence to rise of militarism in Japan Evaluate the consequences of appeasement policy followed by England and France Discuss the cold war Discuss UN 's role in global peace and Cooperation Analyze the role of SAARC and BRICS countries	
Identity, Spirituality and Culture		Age of discovery and exploration Race	Discuss the idea of the age of discovery and exploration Analyze the emergence of the idea of race in relation with age of discovery and exploration Explain the early ideas on the emergence of races and racial identity Discuss the emergence of Mongoloid, Caucasoid, Negroid and Dravidian racial Classification Analyze the causes and effects of racial conflict in the present world, and discuss the contributions of individuals and groups to fight racism	10
			Total	**60**

14.HEALTH and PHYSICAL EDUCATION

Subject: Health and Physical Education **Class XI**

Strand	Themes	Sub Themes	Learning Objectives	Weighting %
Movement and Physical Activity	Movement and skills for sports excellence.	*Movement Skills for Physical Competencies*	• Explain concepts and principles of exercise, basic mechanics of body movements, effects of exercise on body, and difference in individual motor skill acquisition.	40
			• Analyse the principles of body training in relation to human anatomy and physiology for skill development. • Perform advanced skills of vigorous games and sports, and individual fitness programs.	
			• Apply concepts of transfer of training in enhancing physical skills and performance in sports.	
	Fitness for health and quality life.	*FITT for Individual Fitness Programs*	• Explain concept of FITT *(Frequency, Intensity, Time and Type)* principles applied in physical activities for enhancing fitness level.	10
			• Design fitness activities applying FITT*(Frequency, Intensity, Time and Type)* principles to achieve desired health-related and skill-related fitness levels	
			• Implement fitness plan to achieve desired fitness level.	
	Body posture, safety, First Aid and remedies for efficiency and wellbeing..	*Sports Injury Preventions and First Aid for Physical Efficiency*	• Explain sports injuries (*ankle sprain, groin pull, hamstring strain, shin splints, knee injury, and muscle strain, fracture, dislocation, chemical burn),* prevention, related first aid and remedies.	10
			• Perform basic first aid, remedies and rehabilitation exercises for sports-related injuries.	
			• Implement safety measures, first aid and remedial exercises for sports-related injuries.	
		Correct Body Postures for Physical Efficiency	• Explain the impact of common postural deformities on body structure and functions.	5
			• Identify postural deformities (knock *knee, flat foot, Bow leg, lordosis, scoliosis, and kyphosis)* and remedial exercises.	

			• Apply remedial exercises to correct and improve body posture and physiological efficiency.	
Personal and Interpersonal Development	Behaviour and life skills for social harmony	*Safety and Security for Social Harmony*	• Explain the importance of health, safety and social security needs of individual based on Maslow's theory.	5
			• Assess individual health, safety and social security needs for active participation in physical activities and sports.	
			• Plan individual interventions to meet health, safety and social security needs.	
		Life Skills for Individual and Social Wellbeing	• Explain fundamentals of life skills in relation to physical, social, spiritual and emotional wellbeing.	5
			• Identify applications of life skills for healthy social relations and harmony.	
			• Apply core life skills for effective personal and social conduct in daily life.	
Health and Healthy Living	Nutrition choices and habits for longevity and sports excellence.	*Nutrition Choices for Excellence in Sports*	• Explain the importance of dietary diversity *(food groups, food within the groups, nutritional needs for good health)* for sports performance. • Explain the importance of hydration and food requirements for different sports (endurance, team sports, and strength sports). • Explain Recommended Dietary/Daily Allowance for healthy living *(RDA concepts Vitamins, fat-soluble, water soluble, minerals, Relationship of RDA with health).* • Explain nutrient absorption and inhibition *(Food combination-Cooking method-loss of heat sensitive vitamins, food storage-loss of vitamins, spoilage).*	10
			• Identify locally available foods and fluids to enhance nutrition intake in preparing individual dietary plan. • Prepare nutrition and hydration routine depending on the nature and intensity of participation in sports.	
			• Practise healthy dietary and hydration habits to maximise nutrition intake to enhance performance in sports.	
	Water, sanitation	*WASH for Healthy Living*	• Explain 'Integrated Water Resources Management (IWRM)' to sustain of water within school and the community.	10

	and hygiene for healthy living.		• Explain solid wastes and NPK in urine used as an organic fertilizer through 4Rs (*Refuse, Reduce, Reuse, Recycle*).	
			• Conduct online research on WASH related practices. • Identify WASH practices applicable to individual needs. • Identify ways to maintain zero waste in schools and communities	
			• Promote sustainable WASH services and facilities in schools and communities.	
	Healthy and ethical use of substances	*Ethics in substance use for health benefits.*	• Discuss the causes and consequences of unsafe use of substance and doping. • Explain the impact of unsafe use of substance on individual health, family and society.	5
			• Identify strategies to address causes and unsafe use of substance and doping.	
			• Apply life skills to reflect, analyse and make rational decisions in preventing unsafe use of substance and doping.	

Subject: Health and Physical Education **Class XII**

Strand	Themes	Sub Themes	Learning Objectives	Weighting %
Movement and Physical Activity	Movement and skills for active lifestyles	*Movement Skills for Physical Competencies*	• Explain concepts and movement principles *(Law of motion and forces, summation of joints, maximum velocity, applied impulse, law of reaction).*	40
			• Analyse the application of principles of training and conditioning in relation to enhancement of performance in sports. • Perform advanced skills of vigorous activities (games and sports) in individual fitness routine.	
			• Apply principles of training and conditioning for enhancement of performances in vigorous games and sports, and individual fitness routines.	
	Body posture, safety, First Aid and remedies for efficiency and wellbeing.	*Sports Injury Preventions and First Aid for Physical Efficiency*	• Explain sports injuries *(Rotator cuff strains, Achilles tendonitis, Jumper's knee, shin splints, sciatica, tennis elbow, and shoulder injury),* preventions, related first aid and remedies.	10
			• Assess and perform basic first aid, remedies and rehabilitation exercises for specific sports injuries.	
			• Implement safety measures, first aid and remedial exercises for sports injuries.	
		Correct Body Postures for Physical Efficiency	• Discuss common sports injuries (rotator cuff strains, Achilles tendonitis, Jumper's knee, shin splints, sciatica, tennis elbow, shoulder injury) and remedies.	5
			• Identify basic conditioning and remedial exercises for common injuries in sports.	
			• Apply basic body conditioning, safety measures, and remedies to prevent injuries in sports.	
	Fitness for health and quality life.	*FITT for Individual Fitness Programs*	• Explain the concept of FITT *(Frequency, Intensity, Time and Type)* principles applied in physical activities for enhancing fitness level.	10
			• Design fitness plan applying FITT *(Frequency, Intensity, Time and Type)* principles to achieve desired health-related and skill-related fitness levels.	

			• Apply fitness designs and plans to achieve individual desired level of skill-related and health-related fitness.	
Personal and Interpersonal Development	Behaviour and life skills for social harmony	*Safety and Security for Social Harmony*	• Discuss ways of applying SMART (*Sincere, Mindful, Astute, Resilient, Timeless*) in physical activities for promoting individual safety and social security.	5
			• Assess individual behaviours and actions in terms of SMART to promote safety, social security and active participation in physical activities and sports.	
			• Apply life skills to be SMART in daily living for individual and social harmony.	
		Life Skills for Individual and Social Wellbeing	• Explain applications of life skills for efficient participation in vigorous physical activities and sports.	5
			• Assess individual applications of life skills in leading active social lifestyle.	
			• Apply core life skills in leading active social lifestyle and harmony.	
Health and Healthy Living	Nutrition choices and habits for longevity and sports excellence.	*Nutrition Choices for Excellence in Sports*	• Explain the importance of hydration and nutrition requirements for different sports (*training, pre-competition, competition, and recovery, sports supplements, including legality under WADA-World Anti-Doping Agency, and sports drinks).* • Explain *RDA* and dietary habits in enhancing physical activity and sports efficiency (*nutritional diseases, dietary habits,* Serving size, *Dietary diversity, physical activity, balanced energy intake with our nutrient requirement).*	10
			• Prepare nutrition and hydration routine depending on the nature and intensity of coaching and training in sports. • Analyse effective dietary habits in promoting physical activities and sports performances.	
			• Apply healthy eating and hydration habits to improve performance in specialised sports. • Promote dietary habits at homes to improve health in the family and the community.	

	Water, sanitation and hygiene for healthy living.	*WASH for Healthy Living*	• Explain strategies for promoting effective WASH practices in the community. • Explain 'Integrated Water Resources Management (IWRM)' to sustain of water within school and the community. • Explain the importance of proper use of toilets, operations, and maintenance of WASH facilities (for all users).	10
			• Identify ways to carry out simple operation and maintenance of WASH facilities in the community.	
			• Use and efficiently maintain toilets and WASH services and facilities in the community.	
	Healthy and ethical use of substances	*Ethics in substance use for health benefits.*	• Explain the importance of individual, social and government's initiative towards preventing unsafe use of substance and doping.	5
			• Identify ways to prevent unsafe use of substance and doping in line with national and international acts related to substance use, narcotic drugs and doping.	
			• Abide by acts, laws, rules and regulations on safe and ethical use of substance for individual and social wellbeing.	

15.INFORMATION and COMMUNICATION TECHNOLOGY

Coding component			**CLASS:11**		
Strand	**Chapter**	**Topics and Sub-topics**	**Learning Objectives**	**Weighting**	**Period**
D **Coding** (Python)	1. My First Python Program	- print() - Input()	- Master the use of Python development environment, master input () and print () basic use methods, the use of annotations	4	3
	2. Wonderful variables	- Variables - Strings - Three quotation marks	- Mastering the use of variables, the use of assignment symbols, mastering string usage methods and the use of three quotation marks	4	3
	3. Into the world of numbers	- Integers - Float - Basic arithmetic operators	- Master integer, floating-point types and their mutual transformation, and the concept and use of basic arithmetic operators, operational priorities.	4	3
	4. Everything can be counted	- String type - Mathematical functions - Error messages	- Master the use of digital/numeric and string type conversions, commonly used common mathematical functions, and understand error messages	5	3

	5. Intelligent text	- Formatted character output - Built-in functions - Escape characters	- Mastering the use of formatted character output, built-in functions, and escape characters	4	3
	6. Which way is it good to choose?	- If statement - Boolean values	- Master the concept of if and how to use it, understand Boolean values, ==,!=, indent use, the meaning of flowcharts	7	5
	7. Working with multiple selections	- If, else and elif - Logical operators	- Mastery of Else, Elif. The use of statements, comparing operators <, >, <=, >=, and their operational priorities	8	6
	8. More complex options	- Nested conditions - Logical operators	- Mastering nested usage, logical operators and, or, and their operational priorities	8	6
	9. To be free from repetitive work	- For loop (basic) - range() - assignment operators	- Master the concept and use of For Loop Basics, range (), assignment operators and their operational priorities	8	6
	10. Another kind of loop	- While loop - Difference between for and while loop	- Master the while loop concept and use, while the different points of the while and for, the respective scope of application.	8	6
	11. Nested	- Nested while loop	- Mastering the nesting of loops: a combination of for, while and judgment statements, integer(), Random ()	5	6

	12. Stop loop	- Break and continue	- Master the comprehensive use method of circulation, master Break and continue.	5	4
CLASS 11 ICT Literacy component					
A Technology Operation	13. Spreadsheet	**Project on spreadsheet** - Calculations - Chart	- Analyse data on real situations and present it in pictorial formats for decision making.	10	6
B Communication and Collaboration	14. Blogging	**Project on blog** - Create a blog - Write post on blog - Share blog	- Create personal blogs to share their work to online communities for feedback and improvement.	10	6
C Safety and Ethics	15. Fighting Fake news	**Project on fake news** - Distinguish between fake and real news. - Impact of fake news. - Advocacy on social media fake news.	- Use an online platform to create awareness on the impact of fake news on individuals, families and community at large.	10	6
			Total	100	72

Class XII	Part I - HTML				
Strand	**Chapter**	**Topics and Sub-topics**	**Learning Objectives**	**Weighting**	**Periods**
Mark-up Language (46%)	1. Basics of Web Design	**Introduction to HTML** • Concept of tags and containers • Design elements/considerations in web designing	• Understand the concepts of tags, containers and design elements in a webpage.	4	5
	2. Basic HTML tags	**Basic Tags** • Introduction to text editor tool • Basic html tags (head, body, title, header, footer, paragraph, line break, anchor, list, image, align, etc)	• Create a webpage using basic HTML tags.	15	10
	3. Advanced HTML tags	**Advanced Tags** • Table tags • Multimedia tags • Link tags • Form tags	• Enhance a webpage using advanced HTML tags.	22	15
	4. Web designing application	**Application** • Practical web designing project. • Web hosting, domain name, web server.	• Apply HTML elements to complete a practical web designing project.	5	15
Class XII	**Part II - JavaScript**				
Scripting Language (54%)	5. Introduction of JavaScript	**Introduction to JavaScript** • Brief History of JavaScript • Strength and limitation of JavaScript	• Understand the evolution and use of JavaScript.	4	5

		• Support and compatibility with different browsers			
	6. Fundamentals of JavaScript	**Basics of JavaScript** • Scripting tools (Notepad, Notepad++, etc) • The Script tag (beginning, end, statements, comments, output, white space and line breaks, etc) • Inline and external link to JavaScript. • Testing and debugging a script • Event handlers – ✓ onClick(), ✓ onMouseOver(), ✓ onMouseOut().	• EmbedJavaScript in a HTML webpage. • Test a script to check for errors.	10	10
	7. Variables, Operators, & Statements	**Variables, Operators& Statements** • Variables and values • Types of operators • Condition statements (If, If else, If else if) • Loop statement (for, while, do-while)	• Use variables and operators in a program. • Apply appropriate conditions and loop statements in a program	20	15

	8. Functions and Document Object Model	**Functions and DOM** • Concept of functions • Function parameters and argument • Scope of variables (global, local) • **Built in functions** Math object ✓ max() ✓ min() ✓ pow() ✓ random() ✓ round() ✓ sqrt() String Object ✓ length ✓ indexOf() ✓ search() ✓ substring() ✓ concat() ✓ upper() ✓ lower() ✓ charAt() Date and Time ✓ Only creating date object and ✓ Usage of get methods **DOM** related to HTML (in context of validation, new window, calculation, event handler) • Window object methods ○ alert()	• Define and use functions in a program • Access properties and methods of an object using DOT syntax.	15	30

		○ confirm() ○ prompt() ○ close() ○ open() ○ Displaying form data in new window • Methods of document object ○ document.write() ○ document.getElementById() ○ getElementsByName() • innerHTML property • value property • Accessing and validating HTML forms			
	9. Application of JavaScript	**Application** • Interactivity in HTML projects • Customize available scripts for use in the project.	• Create or modify scripts to enhance interactivity in HTML projects.	5	15
			Total	**100**	**120**

16. BUSINESS. MATHEMATICS

Subject: BUSINESS. MATHEMATICS		**Class: 11**	
STRAND/UNIT	**CHAPTER**	**SCOPE** **LEARNING OBJECTIVES**	**WEIGHTING (%)**
ALGEBRA	Sequence and Series	At the end of the chapter, students will be able to solve: ➢ AP, GP: Their meanings and finding the nth term (T_n) and the sum of the series (S_n). ➢ Insertion of arithmetic and geometric means between two numbers; ➢ Sum to infinity of of GP ($\|r\| < 1$).	**20**
	Binomial Theorem	➢ Binomial expansion for positive integral indices; use of Pascal's triangle; and the binomial theorem, i.e., $(x + y)^n = nC0x^n + nC1x^{n-1}y + \ldots + nCny^n$ ➢ Meaning of nCr ➢ Binomial theorem for the expansion of binomial expressions having negative or fractional indices ➢ Finding the general term of the expansions ➢ Application of the theorem for approximation, e.g. $(0.99)8 = (1- 0.01)^8$	
	Logarithms	➢ Revise the laws of Exponents taught in class IX ➢ Relationship between Logarithmic and Exponential expressions ➢ Laws of Logarithm and their properties including the change of base	
	Remainder and Factor Theorem	At the end of the chapter, students will be able to solve: ➢ Meaning of Rational Integral Function ➢ Remainder Theorem ➢ Factor Theorem ➢ Factorization of cubic and quadratic polynomials	
	Quadratic Equations and functions	At the end of the chapter, students will be able to solve: ➢ Solution of Quadratic equations by factorization and use of their graphs/sketches ➢ Solution of Quadratic equations by the Formula method ➢ Nature of roots - Real roots, Complex roots, Equal roots ➢ Introduction to the concept of imaginary and complex numbers through the square root of -1	

	Partial Fractions	At the end of the chapter, students will be able to solve: ➢ Rational functions of the form f(x)/g(x), where f(x) and g(x) are polynomial functions in x ➢ CASE I - degree of numerator < degree of denominator: Type 1 - Non repeated linear factors; Type 2 - Repeated linear factor	
TRIGONOMETRY	Angles and Arc lengths	➢ Angles: Convention of signs of angles; Magnitude of an angle; ➢ Measures of angles; Circular measures ➢ The relation S = rθ, where θ is in radians; Relation between radians and degrees ➢ Arc length and area of a sector of a circle.	**5**
	Trigonometric Functions	At the end of the chapter, students will be able to solve: ➢ Trigonometric ratios; Relationship between trigonometric ratios ➢ Proving simple trigonometric identities ➢ Signs of trigonometric ratios ➢ Limits of trigonometric ratios ➢ Trigonometric ratios of standard angles	
	Compound and Multiple Angles	➢ Addition and Subtraction formulas: Sin (A ± B); Cos (A ± B);Tan (A ± B); Tan (A + B + C); etc., ➢ Double angle, triple angle, half angle and one third angle formula as special cases ➢ Sums and differences as products: e.g. $Sin\ C + Sin\ D = 2\ Sin\ \frac{(C+D)}{2} Cos \frac{(C-D)}{2}$ ➢ Product to sums or differences: e.g. 2 SinACosB = Sin (A +B) + Sin (A - B) etc ➢ Conditional identities (involving angles of triangles	
		➢ Solutions of trigonometric equations (General solution and solution in specified range) ➢ Type 1: Equations in which only one function of a single angle is involved e.g. Sin 5θ = 0	

	Trigonometric Equations	➢ Type 2: Equations expressible in terms of one trigonometric ratio of the unknown angle ➢ Type 3: Equations involving multiple and sub-multiple angles ➢ Equations involving compound angles ➢ Linear equations of the form $a\cos\theta + b\sin\theta = c$, where $\lvert c\rvert \leq (a^2 + b^2)^{\frac{1}{2}}$ and a, b $\neq 0$	
	Properties of Triangles	➢ Sine Rule (including ambiguous case for triangles) Cosine Rule ➢ Projection formula ➢ Napier's Formula for the area of a triangle (Proof and use)	
	Heights and Distances	➢ Practical problems based on angle of elevation and depression (in 2 - D)	
CALCULUS	Functions	➢ Concept of real valued functions; ➢ Domain and Range; ➢ Inverse functions; ➢ Classification of functions; ➢ Sketch of graphs of exponential functions, logarithmic functions, step functions.	**15**
	Limits	At the end of the chapter, students will be able to solve: ➢ Notion and meaning of limits. ➢ Fundamental theorems on limits. ➢ Limits of algebraic functions.	
	Continuity	At the end of the chapter, students will be able to solve: ➢ Continuity of a function at a point x = a; ➢ Continuity of a function in a range.	
	Differentiation	At the end of the chapter, students will be able to solve: ➢ Meaning and geometrical interpretation of derivatives. ➢ Differentiation from first principle. ➢ Derivative of simple algebraic function. Derivative of sums, differences, products and quotients of function. ➢ Application of derivatives: Equation of tangent and normal.	
	Integration	At the end of the chapter, students will be able to solve:	

		➢ Indefinite integral: integration as the inverse of differentiation; ➢ Anti-derivatives of polynomials and functions like $(ax + b)^n$. ➢ Integration by simple substitution for simple polynomial functions.	
CO-ORDINATE GEOMETRY	Points and their coordinates in 2-Dimensions	At the end of the chapter, students will be able to solve: ➢ Cartesian system of coordinates ➢ Distance formula, Section formula ➢ Centroid of a triangle, In-center of a triangle ➢ Area of a triangle using its three vertices, Area of a quadrilateral ➢ Slope or gradient of a line ➢ Angle between two lines ➢ Conditions of perpendicularity and parallelism of two lines.	**5**
	The Straight line	At the end of the chapter, students will be able to solve: ➢ Various forms of equation of lines: point slope form; two points form; intercept form; perpendicular/normal form; general equation of a line; slope/gradient; ➢ distance of a point from a line; ➢ distance between parallel lines.	
	Locus and its equation	➢ Definition of a locus and methods to find the equation of a locus; problems should be limited to fairly simple ones	
	Equations of Circles	➢ Equation of a circle in: Standard form; diameter form; general form; parametric form ➢ Given the equation of a circle, to find the centre and the radius ➢ Finding the equation of a circle, given 3 non-collinear points; and given other sufficient data	
	Theorems on Circles	➢ Theorems on chords of a circle ➢ Theorems on arcs and angles ➢ Theorems on angles in alternate segment	

		➢ Theorems on congruent arc and chords ➢ Theorems on tangent lines and circles	
DATA AND PROBABILITY	Measures of Central Tendency	At the end of the chapter, students will be able to solve: ➢ Mean, Median, Mode; finding by direct methods, formulae	**10**
	Dispersion	At the end of the chapter, students will be able to solve: ➢ Range: Quartiles, inter quartiles ➢ Standard deviation - by direct method, short cut method and step deviation method; ➢ the meaning of Standard deviation should be emphasized. ➢ Mean Deviation about Mean and Combined mean and standard deviation of two groups only from class 12.	
COMMERCIAL MATHEMATICS	Simple Interest and Compound Interest	At the end of the chapter, students will be able to solve: ➢ Meanings and methods of the interest calculations ➢ Problems involving the two types of interests.	**10**
	Discount	At the end of the chapter, students will be able to solve: ➢ Trade discount; problems based on it, Present value, True discount, ➢ Bill of exchange; banker's gain; days of grace; problems based on these.	

17. PURE MATHEMATICS

Subject: PURE MATHEMATICS			**Class: 11**
STRAND/UNIT	**CHAPTER**	**SCOPE** **LEARNING OBJECTIVES**	**WEIGHTING (%)**
ALGEBRA	Sequence and Series	At the end of the chapter, students will be able to understand/solve: ➢ AP, GP: Their meanings and finding the nth term (T_n) and the sum of the series (S_n). ➢ Insertion of arithmetic and geometric means between two numbers; ➢ Sum to infinity of of GP ($\|r\| < 1$).	**20**
	Binomial Theorem	At the end of the chapter, students will be able to solve: ➢ Binomial expansion for positive integral indices; and the binomial theorem, i.e. $(x + y)^n = {}^nC_0x^n + nC_1x^{n-1}y + \ldots + {}^nC_ny^n$ ➢ Meaning of ${}^nC_r$ ➢ Binomial theorem for the expansion of binomial expressions having negative or fractional indices	
	Logarithms	At the end of the chapter, students will be able to solve: ➢ Revise the laws of Exponents taught in class IX ➢ Relationship between Logarithmic and Exponential expressions ➢ Laws of Logarithm and their properties including the change of base.	
	Remainder and Factor Theorem	At the end of the chapter, students will be able to solve: ➢ Meaning of Rational Integral Function ➢ Remainder Theorem ➢ Factor Theorem ➢ Factorization of cubic and quadratic polynomials	
	Quadratic Equations and functions	At the end of the chapter, students will be able to solve: ➢ Solution of Quadratic equations by factorization and use of their graphs/sketches ➢ Solution of Quadratic equations by the Formula method ➢ Nature of roots - Real roots, Complex roots, Equal roots ➢ Introduction to the concept of imaginary and complex numbers through the square root of -1	

	Partial Fractions	At the end of the chapter, students will be able to solve: ➢ Rational functions of the form f(x)/g(x), where f(x) and g(x) are polynomial functions in x ➢ CASE I - degree of numerator < degree of denominator ➢ Type 1 - Non repeated linear factors ➢ Type 2 - Repeated linear factor	
TRIGONOMETRY	Angles and Arc lengths	➢ Angles: Convention of signs of angles; Magnitude of an angle; ➢ Measures of angles; Circular measures ➢ The relation S = rθ, where θ is in radians; Relation between radians and degrees ➢ Arc length and area of a sector of a circle	**10**
	Trigonometric Functions	At the end of the chapter, students will be able to solve: ➢ Trigonometric ratios; Relationship between trigonometric ratios ➢ Proving simple trigonometric identities ➢ Signs of trigonometric ratios ➢ Limits of trigonometric ratios ➢ Trigonometric ratios of standard angles ➢ Trigonometric ratios of allied angles ➢ Periods of trigonometric functions.	
	Compound and Multiple angles	At the end of the chapter, students will be able to solve: ➢ Addition and Subtraction formulas: Sin (A ± B); Cos (A ± B);Tan (A ± B); Tan (A + B + C); etc., ➢ Double angle, triple angle, half angle and one third angle formula as special cases ➢ Sums and differences as products: e.g. $Sin\ C + Sin\ D = 2\ Sin\ \frac{(C+D)}{2} Cos \frac{(C-D)}{2}$ ➢ Product to sums or differences: e.g. 2 SinACosB = Sin (A +B) + Sin (A - B).	
		➢ Solutions of trigonometric equations (General solution and solution in specified range) ➢ Type 1: Equations in which only one function of a single angle is involved e.g. sin 5θ = 0	

	Trigonometric Equations	➢ Type 2: Equations expressible in terms of one trigonometric ratio of the unknown angle ➢ Type 3: Equations involving multiple and sub-multiple angles ➢ Equations involving compound angles ➢ Linear equations of the form $a\cos\theta + b\sin\theta = c$, where $\lvert c\rvert \leq (a^2 + b^2)^{\frac{1}{2}}$ and a, b ≠ 0	
	Properties of Triangles	➢ Sine Rule (including ambiguous case for triangles) Cosine Rule ➢ Projection formula ➢ Napier's Formula for the area of a triangle (Proof and use)	
	Heights and Distances	➢ Practical problems based on angle of elevation and depression (in 2 - D)	
CALCULUS	Functions	➢ Concept of real valued functions; ➢ Domain and Range; ➢ Inverse functions; ➢ Classification of functions; ➢ Sketch of graphs of exponential functions, logarithmic functions, step functions, and simple trigonometric functions like Sinx, Cosx, and Tanx	**20**
	Limits	At the end of the chapter, students will be able to solve: ➢ Notion and meaning of limits; Fundamental theorems on limits; Limits of algebraic and trigonometric functions.	
	Continuity	At the end of the chapter, students will be able to solve: ➢ Continuity of a function at a point x = a; Continuity of a function in a range.	
	Differentiation	At the end of the chapter, students will be able to solve: ➢ Meaning and geometrical interpretation of derivatives; ➢ Differentiation from first principle; ➢ Derivative of simple algebraic and trigonometric functions and their formulae; ➢ Derivative of sums, differences, products and quotients of functions; ➢ Application of derivatives: Equation of tangent and normal.	

	Integration	At the end of the chapter, students will be able to solve: ➢ Indefinite integral: integration as the inverse of differentiation; ➢ Anti-derivatives of polynomials and functions like $(ax + b)^n$, Sin(x), Cos(x), Sec2(x), Cosec2(x) ➢ Integration by simple substitution for simple polynomial functions and simple trigonometric functions	
CO-ORDINATE GEOMETRY	Points and their coordinates in 2-Dimensions	At the end of the chapter, students will be able to solve: ➢ Cartesian system of coordinates ➢ Distance formula, Section formula ➢ Centroid of a triangle, In-center of a triangle ➢ Area of a triangle using its three vertices, Area of a quadrilateral ➢ Slope or gradient of a line ➢ Angle between two lines ➢ Conditions of perpendicularity and parallelism of two lines.	**7**
	The straight line	At the end of the chapter, students will be able to solve: ➢ Various forms of equation of lines: point slope form; two points form; intercept form; perpendicular/normal form; general equation of a line; slope/gradient; distance of a point from a line; distance between parallel lines; Angles between two lines;equations of lines bisecting the angle between the lines; Identical Lines ➢ Family of lines: Lines parallel to ax + by + c = 0 are of the form ay + bx + k = 0; Lines perpendicular to ax + by + c = 0 are of the form ay - bx + k = 0; any line through the intersection of two lines L1 and L2 is of the form L1 + KL2 = 0, where K ∈ R.	
	Locus and its equation	➢ Definition of a locus and methods to find the equation of a locus; problems should be limited to fairly simple ones	
	Equations of Circles	➢ Equation of a circle in: Standard form; diameter form; general form; parametric form ➢ Given the equation of a circle, to find the centre and the radius ➢ Finding the equation of a circle, given 3 non-collinear points; and given other sufficient data	

	Theorems on Circles	➢ Theorems on chords of a circle ➢ Theorems on arcs and angles ➢ Theorems on angles in alternate segment ➢ Theorems on congruent arc and chords ➢ Theorems on tangent lines and circles	
DATA AND PROBABILITY	Measures of Central Tendency	At the end of the chapter, students will be able to solve: ➢ Mean, Median, Mode; finding by direct methods, formulae	**8**
	Dispersion	At the end of the chapter, students will be able to solve: ➢ Range: Quartiles, inter quartiles ➢ Standard deviation - by direct method, short cut method and step deviation method; the meaning of Standard deviation should be emphasized. ➢ Mean Deviation about Mean and Combined mean and standard deviation of two groups only from class 12.	

Subject: BUSINESS MATHEMATICS			**Class: 12**
STRAND/UNIT	**CHAPTER**	**SCOPE** **LEARNING OBJECTIVES**	**WEIGHTING (%)**
ALGEBRA	Permutations and Combinations	➢ Factorial Notation ➢ Concept of Permutation (${}^{n}P_{r}$): Permutation of alike things; restricted permutation; circular permutations ➢ Concept of Combination (${}^{n}C_{r}$): Restricted combinations; Distribution of different things into groups; Open selection of items from different things and from alike things ➢ Mixed problems on permutations and combinations ➢ (note: problems should be of fairly simple ones)	**13**
	Determinants and Matrices	At the end of the chapter, students will be able to solve: *Determinants:* ➢ Of order 2 and 3 ➢ Minors and Co-factors of a determinant ➢ Expansion of a determinant ➢ Solution of simultaneous equations in 2 or 3 variables using Cramer's rule ➢ Conditions for consistency of 3 equations in two variables *Matrices:* ➢ Operations: Addition/Subtraction (Compatibility); Multiplication by a scalar; Multiplication of two matrices (Compatibility) ➢ Adjoint and inverse of a matrix ➢ Use of matrices to solve simultaneous linear equations in 2 unknowns	
	Differential Calculus	At the end of the chapter, students will be able to solve: ➢ Revision of the topics done in class XI ➢ Derivatives of composite, absolute value, implicit and parametric functions ➢ Differentiating function with respect to another function. ➢ Successive differentiation up to 2nd order	**15**
		At the end of the chapter, students will be able to solve:	

CALCULUS	Integral Calculus	➢ Revision of formula of integration from class XI ➢ Standard method of integration by $(ax + b)^n$. ➢ Integration using substitution. ➢ Integration by using partial fractions.	
CO-ORDINATE GEOMETRY	Points and their coordinates in 3-Dimensions	At the end of the chapter, students will be able to solve: ➢ Distance between two points; ➢ Section and mid-point formulas; ➢ Direction cosines and direction ratios of a line; ➢ Angle between two lines; ➢ Conditions for lines to be parallel or perpendicular.	**7**
DATA AND PROBABILITY	Correlation And Regression	At the end of the chapter, students will be able to solve: ➢ Calculation of coefficient of correlation by Karl Pearson's method for ungroup data ➢ Calculation of rank correlation coefficient by Spearman's method, for both repeating and non-repeating data. ➢ Calculation of regression coefficient and the two lines of regression by the method of least squares; use of lines of regression for prediction.	**10**
	Probability	At the end of the chapter, students will be able to solve: ➢ Laws of probability: addition and multiplication laws. ➢ Probability using permutation and combination. ➢ Conditional probability.	
	Annuities	At the end of the chapter, students will be able to solve: ➢ Meaning, Present value, Annuity Certain, Contingent Annuity, Perpetual Annuity, Immediate Annuity, Annuity Due, PV of immediate and perpetual annuity.	**20**

COMMERCIAL MATHEMATICS	Application of Derivatives in Commerce and Economics	At the end of the chapter, students will be able to solve: ➢ Cost Function ➢ Average cost ➢ Marginal cost ➢ Revenue function and break-even point	

Subject: PURE MATHEMATICS			**Class: 12**
STRAND/UNIT	**CHAPTER**	**SCOPE** **LEARNING OBJECTIVES**	**WEIGHTING (%)**
ALGEBRA	Permutations and Combinations	➢ Factorial Notation ➢ Concept of Permutation (${}^{n}P_{r}$): Permutation of alike things; restricted permutation; circular permutations ➢ Concept of Combination (${}^{n}C_{r}$): Restricted combinations; Distribution of different things into groups; Open selection of items from different things and from alike things ➢ Mixed problems on permutations and combinations ➢ (note: problems should be of fairly simple ones)	**9**
	Determinants and Matrices	At the end of the chapter, each student will be able to solve: *Determinants:* ➢ Of order 2 and 3 ➢ Minors and Co-factors of a determinant ➢ Expansion of a determinant ➢ Properties of a determinant and their use in the evaluation of a determinant ➢ Solution of simultaneous equations in 2 or 3 variables using Cramer's rule ➢ Conditions for consistency of 3 equations in two variables *Matrices:* ➢ Operations: Addition/Subtraction (Compatibility); Multiplication by a scalar; Multiplication of two matrices (Compatibility) ➢ Adjoint and inverse of a matrix ➢ Use of matrices to solve simultaneous linear equations in 2 or 3 unknowns	
TRIGONOMETRY	Inverse Trigonometric Functions	At the end of the chapter, each student will be able to solve: ➢ Meaning of inverse trigonometric functions($Sin^{-1}x$, $Cos^{-1}x$, $Tan^{-1}x$, $Cot^{-1}x$, $Cosec^{-1}x$, $Sec^{-1}x$) ➢ Principal values (use of graphs in explanation) ➢ Properties of inverse trigonometric functions (without proof)	**5**

CALCULUS	Differential Calculus	At the end of the chapter, students will be able to solve: ➢ Derivatives of trigonometric, logarithmic, and exponential functions ➢ Derivatives of composite, absolute value, implicit and parametric functions ➢ Interchange of independent and dependent variables ➢ Logarithmic differentiation ➢ Successive differentiation up to 2nd order ➢ Application of maxima and minima to practical problems ➢ Derivatives of inverse trigonometric functions	**20**
	Integral Calculus	At the end of the chapter, students will be able to solve: ➢ Standard method of integration of 1/x, e^x, Tan x, Cot x, Sec x, Cosec x, $(ax + b)^n$, where n∈Q ➢ Integration using substitution ➢ Integration by using partial fractions ➢ Integration by parts ➢ Integrals of the type $Sin^2x\ dx$, $Sin^3x\ dx$, $Cos^2x\ dx$, $Cos^3x\ dx$, ➢ $f'(x)[f(x)]^n\ dx$	
	Definite Integrals	At the end of the chapter, students will be able to solve: ➢ Definite integral as a limit of sum. ➢ Properties of Definite Integral ➢ Application of definite integrals - area of a curve included between x or y axis, volume of revolution about the x-axis or y-axis or about a line.	
	Differential Equations	➢ Meaning of differential equation; order and degree of a differential equation ➢ Solution of differential equation of 1^{st} order and 1^{st} degree ➢ Variable separable ➢ Homogenous equations and equations reducible to homogenous form; $\frac{dy}{dx} + Py = Q$, where P and Q are functions of x only ➢ Solution of differential equations of second order; $\frac{d^2y}{dx^2} = f(x)$	

CO-ORDINATE GEOMETRY	Pairs of Straight Lines	At the end of the chapter, students will be able to solve: ➢ Conditions for general second degree equation to represent a pair of straight lines ➢ Equation of the bisector of the angle between a pair of given straight lines	**16**
	Conics	At the end of the chapter, each student will be able to solve: As a section of a cone ➢ Definition and understanding of Foci, Directrix, Latus Rectum ➢ Recognition of Equation of a Parabola, Ellipse and Hyperbola in standard form ➢ Finding the equation for a conic when focus, directrix, and eccentricity or related data are given ➢ Finding basic information like foci, directrix, etc from a given equation.	
	Points and their co-ordinates in 3-Dimensions	At the end of the chapter, each student will be able to solve: ➢ Direction cosines and direction ratios of a line; ➢ Angle between two lines; ➢ Conditions for lines to be parallel or perpendicular	
	Planes	At the end of the chapter, each student will be able to solve: ➢ Equation of a plane: One-point form; Normal form; Intercept form ➢ Equation of a plane though the intersection of two planes ➢ Finding the equation of a plane given a point and direction cosine/ratios of the normal and other sufficient data	
	Correlation And Regression	At the end of the chapter, students will be able to solve: ➢ Calculation of coefficient of correlation by Karl Pearson's method for ungroup data ➢ Calculation of rank correlation coefficient by Spearman's method, for both repeating and non-repeating data. ➢ Calculation of regression coefficient and the two lines of regression by the method of least squares; use of lines of regression for prediction.	**10**

DATA AND PROBABILITY	Probability	At the end of the chapter, students will be able to solve: ➢ Events: mutually exclusive events, independent and dependent events ➢ Probability of an event using permutations and combinations ➢ Laws of probability: addition and multiplication laws; ➢ Conditional probability.	
COMPLEX NUMBERS	Complex Numbers	At the end of the chapter, each student will be able to solve: ➢ absolute value (modulus) ➢ Argument and Conjugate of complex numbers; polar form ➢ Simple locus equation on complex numbers; proving using $z.z = \| z \|^2$ and $z_1 + z_2 = z_1 \pm z_2$	**5**

18. MEDIA STUDIES

Subject: MEDIA STUDIES **Class: XI**

Strand	Chapter	Scope		Weighting
		Topics/Sub topics	**Learning objectives**	
	Media and information	Evolution of Media Types of Media Information and information Literacy	• Define media and mass media • Critically analyze the forms and roles of media in relation to ancient Bhutanese culture • Draw comprehension on evolution of media in Bhutan • Analyze the effects of advancement in communication technologies • Appreciate the importance of being a media literate • Inculcate the ability to access, analyze, evaluate and produce communication in a variety of forms • Establish skills and ability to think for self and others • Address the communication between the concept of media literacy and strong social beliefs • Infuse interpersonal communication skills through MIL	**16**
	Media and Information Literacy	What is Media Literacy? Importance of Media Literacy Nature of Media Messages	• Identify diverse source of information • Find ways to address the production of information • Practice ethics and responsibility while using any kind of information • Establish wiser means and ways to explore and produce information • Explore ways to take up social responsibility in understanding the media products • Collaborate information with media literacy skills • Practice to be a critical consumer of media products.	**23**

			• Infuse different skills pertaining the media and information as a consumer • Practice to analyze information by using CML's five key questions • Consume and construct media messages through deconstruction and construction skills as a producer and a consumer	
	Media and Language	Basic Persuasion Techniques Key Questions to Look at Media Visual Literacy Film Language	• Classify media products in respect to the concept of ETHOS, PATOS and LOGOS • Critically analyze the forms of advertisement that they encounter in day to day life • Analyze and evaluate the media language. • Identify basic persuasion techniques in common media massages • Create media massages using persuasion techniques • Use the art of media literacy skills to evaluate the media products. • Practice to be presentable by examining the dress codes and etiquettes of reporters. • Critically analyze language and body language when going on air • Create own effective visual presentation by inculcating skills to interpret, create and select visual information tools • Raise their consciousness of visual language and visual thinking • Find creative ways to construct visual massage using sensory images. • Foresee the art of movie making. • Adapt analytical skills to evaluate the movie products. • Practice the art of storytelling by narrating stories.	**23**

			• Use digital technologies to make simple video clips. • Evaluate the art of relating emotional involvement with the scene that they see in movies • Practice the art of using cameras and other technologies	
	Representation in Media	Who Should Media Represent? Determining News Values Analyzing Representation Methods and Technology Media Adopt	• Evaluate the nature of media houses in respect to ownership and its functions. • Critically analyze on how fairly a mainstream media functions • Draw ways to create a fair and just news article • Appreciate the value of news in the society and analyze the news products • Critically evaluate the role of journalist in creating news • Gather news and apply various techniques in writing new • Realize the importance of change in working style with the change in time.	**18**
	Advertising	Player and Professional in Advertising Industry Advertising Regulations Creative Process of Effective Advertisement	• Comprehend the concept and types of advertisement. • Explore the influences of advertising on different players in our society • Develop ability to evaluate and critically understand advertisement • Realize how a good advertisement can bring social harmony • Create advertisement guided by advertising regulation.	**20**
			Total	**100**

Subject: MEDIA STUDIES **Class: XII**

Chapter	Scope		Weighting
	Topics/Sub topics	**Learning objectives**	
Traditional Media (TM) to New Media (NM)	*TM and NM – Collaboration for Success* *Digital as New Media* *Use of NM Technologies in Society* *New Media World and Citizenship Orientation* *Uses of Multimedia Tools*	• Explore why traditional forms of media has its own place in a society and participated actively in enhancing traditional media. • Examine how arrival of new media has made the lives of people easier and participatory in citizenship journalism. • Explore the key differences between traditional media and new media and use them accordingly. • Examine the rise of citizenship journalism in respect to arrival of new media • Identify the areas of collaboration for the traditional and new media to be successful. • Explore the factors leading to change media environment and adapt to the changes accordingly • Explore the advantages and disadvantages of media convergence in publishing news stories. • Examine how digital media has overcome the age-old obstacles of human interaction • Justify how digital media has created virtual world and leeway of many • Explain the opportunities for media technologies to enhance the media socialization • Explore the benefits of online social networking and apply their understanding in accessing information for their learning • Practice the use of social media in a productive manner • Examine the change of communication pattern with the advent of new media • Realize the existence of interactive multimedia tools and use them as tools for raising awareness and promotion of global issues. • Differentiate between educational games and games for entertainment and accordingly use them in a fruitful way	**25**
Journalist Code of Ethics and Research Ethics	*Principles of Journalism* *Research Ethics verses Media Ownership*	• Explore the feasibility of applying principles of journalism in their daily life. • Write news story using the concept of inverted pyramid	**25**

	Process of New Publication	• Apply journalistic code of ethics while conducting research; to collect, organize and report news • Examine the tension between research ethics and media ownership	
Media and Global Village	*Global Economy and Media Ownership* *Technology Convergence and Media Conglomerates* *BICMA – Control of Media in Bhutan* *Intellectual Property Rights & Public-domain Inform*	• Analyze problems and issues related to global media and communicate effectively in the global village. • Explore future scopes and business opportunities in respect to global economy and e-commerce • Explore various open- source software and use the relevant ones for their research work. • Participate in the global village after understanding how media functions internationally • Examine the issues of media ownership in today's global village occurring due to technological convergence and the emergence of media conglomerates. • Explore the scope of advertisement in the media world • Realize the importance of upholding of 'Intellectual Property Rights' and avoid academic crime • Examine the threats of global media on our culture and make smart use of the facilities provided by the global village • Build a strong foundation on global media for their future participation	**25**
Socio-political Media of Globalized Media	*Political Impact of Media Generating Dialogue and Discussion* *Rise of Alternative Media* *Role of Alternative Media and Its Sustenance*	• Explore the concepts of globalized media in understanding multi faced roles played by media in the 21st century. • Critically assess the impact of global media on culture and society. • Examine media as a tool to achieve political mileage. • Explore the role that media plays in migrant or disadvantage communities. • Elucidate on the conditions for the rise of alternative media in the face of mainstream media. • Distinguish alternative media from mainstream media. • Examine the roles of alternative media in a society.	**25**
		Total:	**100**

ASSESSMENT AND EXAMINATIONS GUIDELINES

RATIONALE

The prevailing COVID-19 pandemic, like any other unforeseen calamity, has caught the world unprepared. The current global infection rate of the disease and fatalities related to it is alarming, rendering the global situation volatile. This situation has directly affected the health of the global economy as it influences a myriad of international relations, amongst which, health and education are affected the most.

Every country is doing its best not only to tackle the problems brought about by the pandemic, but also to learn the lessons and prepare for similar scenarios in future. Nations can often compromise their priorities during an emergency such as this, however, Bhutan, as history stands proof, has always accorded the highest priority for the education sector.

His Majesty the King, at the 3rd Convocation of the Royal University of Bhutan:

"if changing realities bring new ambitions and goals, it must also bring new plans and preparation. Most importantly, we have to ask ourselves, how do we build and nurture the people who will implement the plans and fulfil our goals? The answer lies in Education".

To state the obvious, the primary function of education is to prepare the youths for the succeeding generation. As such, the Ministry of Education, Royal Education Council and Bhutan Council for School Examinations and Assessment are committed in putting every means at their disposal in ensuring that every cohort of learners have access and quality of education required in acquiring the expected learning outcomes of the respective grades. Therefore, every possible avenue is explored to ensure that every student has access to learning to continue learning, and for measures to strengthen the system for the post COVID 19 pandemic, despite the dire situations as this.

With the schools closed down for a prolonged period due to the prevailing situation, the implementation of the regular curricula has not been feasible. Hence, schools have been directed to implement the adapted or prioritized curricula, and provisions for safety and psychosocial wellbeing of students are in operation.

The volatile evolving situation around the world calls for reorganization, adjustment and sacrifices of social services, facilities and national priorities. For the education sector, the prerogative is envisioning situation based learning areas, either adapted or prioritized curriculum, with a different set of objectives, modes, and techniques of assessment and examinations aligned with the standard learning outcomes for the academic year 2020.

Objectives

The guidelines on Assessment & Examinations for Education in Emergency Curriculum has been developed through consultative approach amongst the professionals from the Ministry of Education, Royal Education Council and the Bhutan Council for School Examinations and Assessment with the following objectives.

i. Guide the schools and other relevant agencies on the conduct of assessment and examinations, both home and the board examinations.

ii. Inform the stakeholders such as parents, students, education sector and tertiary education institutes about the changes in assessment and examinations, and provide monitoring and support services accordingly.

iii. Provide directives on smooth promotion and certification for progression of students to higher learning grades despite the emergency.

iv. Provide proper guidance and support for maintaining consistency of assessment modalities.

v. Facilitate continuous learning of students, including students with disabilities, so that they progress to higher grade with adequate competencies.

ASSESSMENT AND EXAMINATIONS MODALITIES

Overview of Strategic Plan for School Curriculum and Assessment for EiE Phase 2

The EiE Phase 2 envisages that the continued learning is adherence to the following.

<table>
<tr><th colspan="3">Scenario & Situation</th><th>Curriculum</th><th>Mode</th><th>Assessment</th></tr>
<tr><td rowspan="5">Scenario I</td><td rowspan="2">Situation 1</td><td rowspan="3">If all schools open at the same time</td><td>Class PP – 9 & 11 Prioritized Curriculum</td><td>Regular class with safety and precautionary measures</td><td rowspan="2">Regular on prioritised curriculum
(CFA, Tests, year-end examinations)</td></tr>
<tr><td>Class 10 & 12 Prioritized Curriculum</td><td>Regular class with safety and precautionary measures</td></tr>
<tr><td rowspan="3">Situation 2</td><td>Class PP – 9 & 11 Adapted Curriculum</td><td>Open: Regular class with safety and precautionary measures
Closed:
(A) PP-3: BBS, Social media (Wechat / WhatsApp / Telegram), Radio, SIM
(B) Cl 4 -9 & 11: BBS, SIM, Google classroom</td><td>Class PP – 9 & 11: Conventional test / short assignment / Objective type question pattern</td></tr>
<tr><td>Class 10 & 12 Prioritized Curriculum</td><td>Regular class with safety and precautionary measures</td><td>Board Examinations with Safety and preventive measures (25 days) on prioritized curriculum</td></tr>
<tr><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>Scenario II</td><td colspan="2">All schools closed</td><td>Class PP – 9 & 11 Adapted Curriculum</td><td>A) PP-3: BBS, Social media (Wechat / WhatsApp / Telegram), Radio, SIM
(B) Cl 4 -9 & 11: BBS, SIM, Google classroom</td><td>Class PP – 9 & 11: Conventional test / short assignment / Objective type question pattern</td></tr>
</table>

		Class 10 & 12 Prioritized Curriculum	Regular class in quarantine mode.	Board Examinations with Safety and preventive measures (25 days) on prioritized curriculum
NOTE:	For effective curriculum delivery as well as to provide support for psycho-social wellbeing: • Follow Ministry of Health's protocol and preventive measures. • Follow WASH advisory. • No mid-term examinations. • No trail examinations. • No co-curricular and extra-curricular activities. • Mid-term break to be used as instructional days. • Use Saturdays to adjust instructional days. • Strengthen psychosocial support including help-centres.			

School Zonation

High risk: Class and examinations with preventive measures for classes X & XII based on prioritised curriculum, and online classes for other classes based on the adapted curriculum.

Medium risk: Class and examinations with preventive measures for classes X & XII based on prioritised curriculum, and alternative class for classes PP- IX & XI based on adapted curriculum (some schools will be closed and some will be opened).

Low risk: Schools will be opened and follow adapted curriculum for classes PP- IX & XI and prioritised curriculum for classes X and XII.

To ensure equity in availing educational opportunities and services during emergencies and crisis situations, such as COVID-19 pandemic, assessment and examinations are informed and based on the Adapted Curriculum and Prioritized Curriculum.

SCENARIO I - Situation I

If all schools reopen from June 2020 onward, prioritized curriculum shall be offered for all classes. Both home and board examinations shall be conducted on the contents of the prioritized curriculum.

A. Assessment Modalities

1. Modes & Strategies

The following shall inform the conduct of assessment:

1.1. Key Stage I – Classes PP - III

1.1.1. Schools shall follow the modality of assessment as per the CFA guidelines for classes PP – III.

1.1.2. The classes PP – III teachers shall consolidate the progress of students and report to parents/guardian as follows:

i. For quarter I and II in August.
ii. For quarter III in mid-October.
iii. For quarter IV and overall consolidated progress report at the end of the academic session in mid-December.

1.2. Key Stage II to V: Classes IV-XII

1.2.1. Schools to conduct assessment on the prioritised curriculum

1.2.2. Owing to the lapse in term I, term II assessment shall be considered for promotion

1.2.3. For classes XI and XII, the cumulative marks of project work for Sciences, History, Environmental Science, Accountancy and Geography shall be considered as a part of CA.

1.2.4. For class X, CA marks for all subjects shall be converted into appropriate percentage by schools and submitted to BCSEA.

1.2.5. For class XII (BHSEC and LCSC), total internal marks in relevant subjects shall be converted into appropriate percentage by schools and submitted to BCSEA.

2. Assessment Techniques and Tools

The objectivity and reliability of the conduct of the assessment shall be guided by the following.

2.1. Class tests on the prioritized curriculum by using paper and pencil for content knowledge.

2.2. Practical work and project work assessed by using rubrics, checklist and rating scale for psychomotor and affective domains.

2.3. Continuous assessment for ongoing learning by using tools like rubrics, checklist, rating scale and other subject specific tools.

3. Reporting & Recording

3.1. Schools shall record and report of students' performance based on the CFA guidelines for classes PP – III.

3.2. Teachers shall record and report on students based on the continuous assessment guidelines as outlined in respective subjects for classes IV to XII.

3.3. The aggregate scores attained by students at the end of the year in numerous assessment tasks shall contribute to promotion of students.

B. Examinations Modes and Strategies

1. Modes and Strategies

In this situation, both home and board examinations shall be conducted on the contents of the prioritized curriculum.

1.1. Home Examinations

The Home Examinations shall be informed by the following:

1.1.1 There shall be no formal examination for the Key Stage I vide letter number DSE/SPCD/ADM(1.1) /2020/209 dated 3rd March 2020. Students in the key stage I (classes PP-III) shall be promoted to the next higher level upon the fulfilment of pre-existing conditions set out in the CFA guidelines.

1.1.2. For key stages II to V, examinations shall be based on the prioritized curriculum.

1.1.3. The duration and weighting for home examinations should remain the same to ensure the validity and credibility of the results issued by schools.

1.1.4. The contents of the prioritized curriculum comprise about 65% of the regular curriculum content / learning outcomes to enable progression to the next higher level. This is based on the premise that the number of instructional days i.e., about 120 days, available for the delivery of subject contents, schools would still have about five months of contact teaching in addition to the online, TV classes, SIM and radio. It is also considering the time needed for counselling and health practices for safety of students.

1.1.5. Practical examinations for science, accountancy and computer studies shall be conducted based on the prioritized curriculum (65% content of the regular curriculum) learning outcomes.

1.1.6. There shall neither be midterm nor trial examinations conducted in order to make up for the lost instructional time.

1.2. Board Examinations

The Board Examinations shall be conducted for classes X and XII. This shall be based on the following.

1.2.1. The board examinations shall be convened as per the schedule provided by the BCSEA.

1.2.2. The board examinations or high-stake examinations shall be based on the prioritized curriculum.

1.2.3. The prioritized curriculum covers about 65% of the regular curriculum contents and learning outcomes deemed necessary to enable progression of students to the next higher level. This is based on the premise that the number of instructional days i.e., about 120 days, available for the delivery of subject contents, schools would still have about five months of contact teaching in addition to the online, TV classes, SIM and radio.

1.2.4. The duration and weighting for board examinations shall remain the same to ensure the validity and credibility of certification under the authority of BCSEA.

1.2.5. Practical examinations for BHSEC science, accountancy and computer studies shall be conducted based on the prioritized curriculum.

1.2.6. The overall result of the student and the certification shall be based on the aggregate of Internal / Continuous Assessment Marks submitted by schools and the Examination Marks.

2. Techniques and Tools

The objectivity and reliability of the conduct of the Home Examinations and Board Examinations shall be guided by the following:

2.1. Examinations and class test by using paper and pencil for content knowledge.

2.2. Practical work and project work assessed by using rubrics, checklist and rating scale for psychomotor and affective domains.

2.3. Continuous assessment for ongoing learning by using tools like rubrics, checklist, rating scale and other subject specific tools.

3. Reporting and Recording

3.1. Home examinations

3.1.1. Grading for subjects for classes PP to IX and XI by schools.

3.1.2. Grading for SUPW for classes VII to IX and XI by schools.

3.1.3. Progress report for students for classes PP to IX and XI by schools.

3.2. Board examinations

3.2.1. Continuous Assessment / Internal Marks for subjects for classes X and XII by schools.

3.2.2. Grading for SUPW for classes X and XII by schools.

3.2.3. Certification under the authority of BCSEA.

SCENARIO I – Situation 2

If schools reopen in a phased manner based on the risk-level zonation (low, medium and high), adapted curriculum shall be offered to classes PP-IX and XI, and prioritized curriculum shall be offered to classes X and XII. Assessment and examinations shall be informed by the following guidelines.

A. Assessment Modalities

If schools open phase wise, assessment shall be conducted based on the contents of the prioritized curriculum for classes X and XII, and adapted curriculum for other classes.

1. Assessment Modes and Strategies

1.1 Key Stage I - V: Classes PP – IX & XI

1.1.1. Assessed through conventional test / short assignment / objective type question pattern.

1.1.2. For unreached and non-responsive students, *Dzongkhags* and *Thromdes* to explore alternative ways of assessment, for instance delegating mobile teachers to ensure all students are assessed and supported.

1.1.3. Based on the prioritized curriculum for classes X & XII, schools shall plan and assign tasks to students so that they are meaningfully engaged and authentic assessment is carried out for learning progression and promotion irrespective of the zones.

1.1.4. The delivery of instructions can be as follows:

Open:
Regular class with safety and precautionary measures.
Closed:
(A) PP-3: BBS, Social media (Wechat/WhatsApp/ Telegram), Radio, SIM.
(B) Cl 4 -9 & 11: BBS, SIM, Google classroom.

1.1.5. Schools shall use BBS lessons and google classroom (IV - IX & XI) for assigning tasks to students and keeping evidences of student learning based on adapted curriculum. Relevant trainings to support use of google classroom effectively shall be continuously provided.

1.1.6. Based on the adapted curriculum for class PP-IX and XI, schools shall plan and assign tasks to students so that they are meaningfully engaged and appropriate assessment is carried out for learning progression and promotion for classes PP-IX & XI.
For those unreached through BBS and google classroom, support shall be provided through SIM (print materials), radio broadcast, and curated content.

1.1.7. Teachers shall assess and provide feedback on the performance of students and maintain the records based on assignment submitted by students.

1.1.8. Promotion of a student shall be based on the record of marks obtained through records maintained by respective subject teachers on the various tasks performed by students.

1.1.9. The following modified weighting shall be used to assess and report on students' performance: Conventional Test / objective type question pattern - 40%; short assignment 60% in lieu of home examinations.

2. Assessment Techniques and Tools

The objectivity and reliability of the conduct of the assessment shall be guided by the following.

2.1. Continuous assessment for ongoing learning / internal marks for Board Examinations from online platform by using tools like rubrics, checklist, rating scale and other subject specific tools.

2.2. Teachers use appropriate tools as described in the respective subjects

3. Reporting & Recording

Schools shall ensure that performance of children are recorded and reported based on the "Assessment and Examination" protocols as dictated by the evolving situation.

3.1. Teachers to maintain e-Learning log book for delivery of lessons through online mode.

3.2. Teachers of class IV-XII shall keep records on BBS lessons and Google Classroom and CFA grades generated from this platform.

3.3. Principals and DEOs to keep the proper records of delivery of lessons.

B. Examination Modalities & Strategies

1. Modes and Strategies

1.1. Home Examinations

1.1.1. The adapted curriculum which is theme based is implemented in this situation.
Owing to social distancing priority, the formal examinations are not feasible on the adapted curriculum for classes PP-IX and XI

1.1.2. Class PP – 9 & 11: Conventional test / objective type question pattern and short assignment are used for promotion of students. It is imperative for teachers to continue maintaining records of activities and assessments submitted by individual student.

1.2. Board Examinations

1.2.1. The board examinations shall be convened as per the schedule provided by the BCSEA. The examinations shall be preponed (mid-November) and the BCSE, BHSEC and LCSC XII examinations shall be held on alternate days

1.2.2. The board examinations for classes X and XII shall be conducted on the prioritized curriculum by complying with the safety protocols set by the Ministry of Health.

1.2.3. Practical examinations for relevant subjects shall not be conducted for class XII, as students do not have opportunity to get hands-on experience. Therefore, the theory papers for BHSEC science, accountancy and computer studies shall be assessed out of 100% weighting.

1.2.4. The project works intended for board examinations for relevant subjects shall not be conducted.

1.2.5. The SUPW grades for classes X and XII shall be based on classes IX and XI grades and on the current grades performance.

1.2.6. The assessment for AgFS (class X) which is 100% from schools shall be based on the marks obtained in class IX.

1.2.7. In absence of internal marks for class XII in AgFS, *Driglam* (LCSC) and *Luzhey* & *Nyencha* (LCSC) from schools, theory papers shall be assessed out of 100%.

1.2.8. For class X, teachers concerned shall keep a record of individual student's performance on their assignments/projects, which shall be used to generate marks for continuous assessment. These marks shall be submitted to BCSEA.

1.2.9. For Media Studies (class XII), teachers concerned shall keep a record of individual student's performance on their assignments/projects which should be used to generate marks for internal assessment. These marks shall be submitted to BCSEA.

1.2.10. Board examinations shall be conducted in the centres identified by BCSEA in collaboration with *Dzongkhag* and *Thromde* Administration by complying with the safety protocols in a quarantine mode.

1.2.11. Marking workshop shall be conducted by BCSEA complying with the safety protocols set by the Ministry of Health.

2. Techniques and Tools

The objectivity and reliability of the conduct of the Home Examinations and Board Examinations shall be guided by the following.

2.1. Home examinations

2.1.1. Continuous assessment / internal marks for Home Examinations shall be based from online platform by using tools like rubrics, checklist, rating scale and other subject specific tools.

2.1.2. Short assignments for all subjects in all classes in lieu of formal examinations shall be assigned and assessed. This shall be the basis for promotion.

2.1.3. Teachers use appropriate tools as described in the respective subjects for continuous assessment for ongoing learning.

2.2. Board examinations

2.2.1. Board examinations shall be conducted through paper and pencil test in a quarantined manner following the safety protocols set by the Ministry of Health.

2.2.2. Continuous assessment / internal marks for Board Examinations shall be based on records maintained using tools like rubrics, checklist, rating scale and other subject specific tools.

2.2.3. Teachers use appropriate tools as described in the respective subjects for continuous assessment for ongoing learning.

3. Reporting and Recording

3.1. Home examinations

3.1.1. Grading of subjects for classes PP to IX and XI by schools based on the CA and short assignments in lieu of summative examinations.

3.1.2. Progress report for students for classes PP to IX and XI shall be issued by schools.

3.2. Board examinations

3.2.1. Schools shall generate and submit internal / CA marks to BCSEA.

3.2.2. Grading for SUPW for classes X and XII based on classes IX and XI by schools.

3.2.3. Certification under the authority of BCSEA.

SCENARIO II

If there is a national lockdown, all schools shall remain closed. Adapted curriculum shall be offered to classes PP-IX and XI, and prioritized curriculum shall be offered to classes X and XII. Assessment and examinations shall be informed by the following guidelines.

A. Assessment Modalities

If schools remain closed, assessment shall be conducted based on the contents of the prioritized curriculum for classes X and XII, and adapted curriculum for other classes.

1. Assessment Modes and Strategies

1.1. Key Stage I: Classes PP – III

1.1.1. The overall consolidated progress shall be reported at the end of the year using the result sheet format provided in the CFA guidebook.

1.1.2. For unreached and non-responsive students, *Dzongkhags* and *Thromdes* to explore alternative ways of assessment, for instance delegating mobile teachers to ensure all students are assessed and supported.

1.2. Key Stage II – V: Classes IV –XII

1.2.1. Schools shall use google classroom (IV -IX &XI) interactively for instruction, assigning tasks to students and keeping evidences of student learning based on adapted and prioritized curriculum. Relevant trainings to support use of google classroom effectively shall be continuously provided.

1.2.2. Based on the prioritized curriculum for classes X & XII, schools shall plan and assign tasks to students so that they are meaningfully engaged and authentic assessment shall be carried out for learning progression and promotion.

1.2.3. Based on the adapted curriculum for class PP-IX and XI, schools shall plan and assign tasks to students so that they are meaningfully engaged and appropriate assessment is carried out for learning progression and promotion for classes PP-IX & XI.

1.2.4. For those unreached through google classroom, support shall be provided through SIM (print materials); radio broadcast and curated content

1.2.5. Teachers shall assess and provide feedback on the performance of students and maintain the records based on assignment submitted by students.

1.2.6. Promotion of a student shall be based on the record of marks obtained through records maintained by respective subject teachers on the various tasks performed by students.

1.2.7. The following modified weighting shall be used to assess and report on students' performance: CA 40%, PW 60% in lieu of home examinations.

2. Assessment Techniques and Tools

The objectivity and reliability of the conduct of the assessment shall be guided by the following.

2.1. Continuous assessment for ongoing learning / internal marks for Board Examinations from online platform by using tools like rubrics, checklist, rating scale and other subject specific tools.

2.2. Teachers use appropriate tools as described in the respective subjects.

3. Reporting & Recording

Schools shall ensure that performance of children are recorded and reported based on the "Assessment and Examinations" protocols dictated by the evolving situation.

3.1. Teachers to maintain e-Learning log book for delivery of lessons through online mode.

3.2. Teachers of class IV-XII shall keep records on BBS lessons and Google Classroom and CFA grades generated from this platform.

3.3. Principals and DEOs to keep the proper records of delivery of lessons.

B. Examination Modalities & Strategies

1. Modes and Strategies

1.1. Home Examinations

1.1.1. The adapted curriculum which is theme based is implemented in this situation.

1.1.2. For key stage I, the performance of students shall be based on instructions and assessment tasks provided through BBS lessons or other social media platforms (WeChat, WhatsApp, telegram etc.). It is imperative for teachers to continue maintaining records of activities and assessments submitted by individual student.

1.1.3. Practical examinations for relevant subjects shall not be conducted for all levels as students do not have opportunity to get hands-on experience.

1.1.4. In lieu of home examinations, students carry out subject specific short assignment on innovative and creative ideas with write-up/essay/journal, assessed and validated based on the project work guidelines provided in respective subjects.

1.1.5. Conduct TVET theory class online and practical onsite by following quarantine protocols.

1.1.6. In lieu of home examinations for classes IV to IX and XI, promotions shall be based on the CA and short assignment

1.2. Board Examinations

1.2.1. The board examinations shall be convened as per the schedule provided by the BCSEA. The examinations shall be preponed (mid-November) and the BCSE, BHSEC and LCSC XII examinations will be held on alternate days

1.2.2. The board examinations for classes X and XII shall be conducted on the prioritized curriculum by complying with the safety protocols set by the Ministry of Health.

1.2.3. Practical examinations for relevant subjects shall not be conducted for class XII, as students do not have opportunity to get hands-on experience. Therefore, the theory papers for BHSEC science, accountancy and computer studies shall be assessed out of 100% weighting.

1.2.4. The project works intended for board examinations for relevant subjects shall not be conducted.

1.2.5. The SUPW grades for classes X and XII shall be based on classes IX and XI grades.

1.2.6. The assessment for AgFS (class X) which is 100% from schools shall be based on the marks obtained in class IX.

1.2.7. In absence of internal marks for class XII in AgFS, *Driglam* (LCSC) and *Luzhey* & *Nyencha* (LCSC) from schools, theory papers shall be assessed out of 100%.

1.2.8. For class X, teachers concerned shall keep a record of individual student's performance on their assignments/projects, which shall be used to generate marks for continuous assessment. These marks shall be submitted to BCSEA.

1.2.9. For Media Studies (class XII), teachers concerned shall keep a record of individual student's performance on their assignments/projects which should be used to generate marks for internal assessment. These marks shall be submitted to BCSEA.

1.2.10. Quarantine Board examinations shall be conducted in the centres identified by BCSEA in collaboration with *Dzongkhag* and *Thromde* Administration by complying with the safety protocols.

1.2.11. Marking workshop shall be conducted by BCSEA complying with the safety protocols set by the Ministry of Health.

2. Techniques and Tools

The objectivity and reliability of the conduct of the Home Examinations and Board Examinations shall be guided by the following.

2.1. Home examinations

2.1.1. Short assignments for all subjects in all classes in lieu of formal examinations shall be assigned and assessed. This shall be the basis for promotion.

2.1.2. Continuous assessment / internal marks for Home Examinations shall be based from online platform by using tools like rubrics, checklist, rating scale and other subject specific tools.

2.1.3. Teachers use appropriate tools as described in the respective subjects for continuous assessment for ongoing learning.

2.2. Board examinations

2.2.1. Board examinations shall be conducted through paper and pencil test in a quarantined manner following the safety protocols set by the Ministry of Health.

2.2.2. Continuous assessment / internal marks for Board Examinations shall be based on records maintained using tools like rubrics, checklist, rating scale and other subject specific tools.

2.2.3. Teachers use appropriate tools as described in the respective subjects for continuous assessment for ongoing learning.

3. Reporting and Recording

3.1. Home examinations

3.1.1. Grading of subjects for classes PP to IX and XI by schools based on the CA and alternative summative examinations by short assignment

3.1.2. Progress report for students for classes PP to IX and XI shall be issued by schools.

3.2. Board examinations

3.2.1. Schools shall generate and submit internal / CA marks to BCSEA

3.2.2. Grading for SUPW for classes X and XII based on classes IX and XI by schools.

3.2.3. Certification under the authority of BCSEA.

C. MONITORING AND EVALUATION

1. Dzongkhag /Thromde Level

1.1. The respective CDEOs/CTEOs and school principals shall make necessary adjustment to ensure that online lessons and assessment and engagement of students and all students have access to educational services and opportunities.

1.2. Localise the implementation of EiE curriculum and program and activities by instituting Dzongkhag Level Professional Forum (DLPF) coordinated by Teacher Resource Centres (TRC) to provide educational services.

1.3. The DLPF shall monitor and make arrangement to provide necessary intervention on online lessons and assessment.

1.4. For classes X and XII, respective *Dzongkhags* and *Thromdes* to identify boarding schools to accommodate students as boarders including day scholars and deliver prioritized curriculum in a quarantined manner.

1.5. Board examinations shall be implemented for affected centres in the boarding schools identified by BCSEA in consultation with *Dzongkhags / Thromdes* in a quarantined mode.

2. Ministry of Education

2.1 Based on the evolving situation, the MoE shall formulate policy guidelines, advisory notes and directives for information and effective implementation of EiE curriculum, programs and activities.

2.2 Facilitate the development and dissemination of necessary inclusive EiE materials and resources for schools.

2.3 Explore and provide necessary interventions in making the educational services and opportunities accessible for all students with especial consideration for special needs students.

2.4 Convert video lessons to audio format for schools with SEN and other classes in relevant subjects.

3. Royal Education Council

3.1. Design and develop EiE curriculum materials appropriate for all including learners with special needs.

3.2. Design and disseminate appropriate assessment protocols for EiE curriculum and its implementation.

3.3. Provide necessary interventions on curriculum implementation in schools. Questions on video lessons and SIM shall be strengthened and enhanced to ensure comprehensive coverage of three domains of learning objectives.

3.4. For uniformity, it has been decided that:

i. If schools reopen before August, 2020, 65% of content will be prioritized for all classes. *Note: The annual instructional hours is 900, and the total remaining hours is about 550, which is nearly equivalent to 61.11%. Given that some forms of learning occurred in EiE Phase 1, it is rounded to 65%.*

ii. Curriculum Developers for each subject shall identify the content areas are prioritized in consultation with BCSEA and subject teachers.

4. Bhutan Council for School Examinations and Assessment

4.1. Adapt or formulate Examination Rules and Regulations and protocols for EiE curriculum based on the evolving situation.

4.2. Make necessary adjustment and consideration to facilitate all students to participate in assessment and examinations.

4.3. Inform the schools regarding assessment modality and conduct of examination and evaluation. Timetable for conduct of board examinations (classes X and XII) based on the evolving situation 1 and 2 shall be shared to all stakeholders.

4.4. Validate and certify the results of Examinations of EiE curriculum.

5. Parents/Guardians

5.1. Guide children in engagement on EiE online programs and activities.

5.2. Facilitate children in completing the assessment tasks and activities.

5.3. Provide feedback on their children learning and the EiE curriculum materials and programs to the schools.

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