ENGLISH (01)

Aims:

1. To develop and integrate the use of the four language skills i.e. listening, speaking, reading and writing for the purpose of effective communication.
2. To develop a functional understanding of the grammar, structure and idiom of the language.
3. To develop the capacity to read efficiently and access information effectively.
4. To develop an appreciation of good literature.
5. To experience, through literature, the thoughts and feelings of the peoples of the world.

CLASSES IX & X

*There will be **two** papers:*	**Paper 1:**	English Language	(80 Marks)
Paper 1: English Language		*Internal Assessment*	*(20 Marks)*
Paper 2: Literature in English	**Paper 2:**	Literature in English	(80 Marks)
*Each of these papers will be of **two hours** duration.*		*Internal Assessment*	*(20 Marks)*

PAPER 1 - ENGLISH LANGUAGE

(Two hours) - 80 Marks

All questions will be compulsory.

Question 1: Candidates will be required to write a composition of about **300– 350** words from a choice of subjects which will test their ability to: organise, describe, narrate, report, explain, persuade or argue, present ideas coherently with accuracy and precision, compare and contrast ideas and arrive at conclusions, present relevant arguments and use correct style and format.

The topics will be varied and may be suggested by language or by other stimuli such as pictures. The topics will be so chosen so as to allow the candidates to draw on first-hand experience or to stimulate their imagination.

The organisation of subject matter, syntax, punctuation, correctness of grammatical constructions and spelling will be expected to be appropriate to the mode of treatment required by the subject.

Question 2: Candidates will have to write a letter from a choice of two subjects requiring either a formal or a friendly mode of treatment. Suggestions regarding the content of the letter may be given. The format of the letter with address, introduction, conclusion, etc., will form part of the assessment. Special attention must be paid to the format of the letter with emphasis on tone and vocabulary appropriate to the context.

Question 3: Candidates will be given a specific situation and will be required to:

(a) Write the text for a notice based on given directions.

(b) Write an e-mail on the same content as the notice.

Question 4: An unseen prose passage of about **500** words will be given. Uncommon items of vocabulary, or structure will be avoided. A question will be set to test vocabulary. Candidates will be required to show an understanding of the words/phrases in the context in which they have been used.

A number of questions requiring short answers will also be asked on the passage. These questions will test the candidates' ability to comprehend the explicit content and organisation of the passage and to infer information, intention and attitude from it.

The last question will consist of a summary that will test the candidates' ability to distinguish main ideas from supporting details and to extract salient points to re-write them in the form of a summary. Candidates will be given a clear indication of what they are to summarise and of the length of the summary.

Question 5: There will be a number of short answer questions to test the candidates' knowledge of **functional** grammar, structure and usage.

All the items in this question will be compulsory. They will consist of correct use of prepositions, conjunctions, verbs and structure of sentences.

PAPER 2 - LITERATURE IN ENGLISH

(Two hours) - 80 Marks

Candidates will be required to answer questions based on the prescribed textbooks, which include Drama, Prose (Short Stories) and Poetry.

Drama and Prose (Short Stories)

Questions set will be central to the text. Candidates will be required to show that they have understood the passage and are able to clearly respond in their own words.

Excerpts may be given from the drama and prose texts leading to questions.

Poetry

A poem, or lines from poems, will be given and questions will be set to test the candidates' response. The questions will focus on the content, understanding and the personal response of candidates to the entire poem as a whole.

SYLLABUS TO BE COVERED

Class IX

I. DRAMA: ***Julius Caesar - William Shakespeare*** **(Acts I & II*)***

II. TREASURE CHEST: A Collection of ICSE Short Stories & Poems (Evergreen Publications (India) Ltd. New Delhi)

PROSE (Short Stories):

1. *Bonku Babu's Friend – Satyajit Ray*
2. *Oliver Asks for More – Charles Dickens*
3. *The Model Millionaire – Oscar Wilde*
4. *Home-coming – Rabindranath Tagore*
5. *The Boy who Broke the Bank – Ruskin Bond*

POETRY:

1. *The Night Mail – W.H. Auden*
2. *Skimbleshanks: The Railway Cat – T.S. Eliot*
3. *I Remember, I Remember – Thomas Hood*
4. *A Doctor's Journal Entry for August 6, 1945 – Vikram Seth*
5. *A Work of Artifice – Marge Piercy*

NOTE: ***The Class IX Examination is to be conducted on the portion of the syllabus that is prescribed for Class IX.***

Class X

I. DRAMA: ***Julius Caesar: William Shakespeare*** **(Acts III, IV & V*)***

II. TREASURE CHEST: A Collection of ICSE Short Stories & Poems (Evergreen Publications (India) Ltd. New Delhi)

PROSE (Short Stories):

1. *With the Photographer – Stephen Leacock*
2. *The Elevator – William Sleator*
3. *The Girl Who Can – Ama Ata Aidoo*
4. *The Pedestrian – Ray Bradbury*
5. *The Last Lesson – Alphonse Daudet*

POETRY:

1. *Haunted Houses – H.W. Longfellow*
2. *The Glove and the Lions – Leigh Hunt*
3. *When Great Trees fall – Maya Angelou*
4. *A Considerable Speck – Robert Frost*
5. *The Power of Music – Sukumar Ray*

NOTE: ***The ICSE (Class X) Examination paper will be set ONLY on the portion of the syllabus that is prescribed for Class X.***

INTERNAL ASSESSMENT

Paper 1 - English Language

1. Schools will prepare, conduct and record assessments of the **Listening and Speaking Skills** of candidates as follows:

Class IX: Three assessments in the course of the year.

Class X: Two assessments in the course of the year.

2. Pattern of Assessment

a) Listening Skills

A passage of about 300 words is read aloud by the examiner *twice,* the first time at normal reading speed (about 110 words a minute) and the next time at a slower speed. Candidates may make brief notes during the readings. They then answer an objective type test based on the passage, on the paper provided.

The recommended number of candidates at a sitting is 30.

b) Speaking Skills

Each candidate is required to make an oral presentation for about two minutes, which will be followed by a discussion on the subject with the examiners, for about three minutes.

Subjects for presentation may include narrating an experience, providing a description, giving directions how to make or operate something, expressing an opinion, giving a report, relating an anecdote or commenting on a current event.

A candidate may refer to brief notes in the course of the presentation but reading or excessive dependence on notes will be penalized.

It is recommended that candidates be given an hour for preparation of their subject for presentation and that they be given a choice of subject, on a common paper.

EVALUATION

The assessment will be conducted jointly by the subject teacher and the external examiner who will each assess the candidate. (The External Examiner may be a teacher nominated by the Head of the School who could be from the faculty **but not teaching the subject in the section/class.** For example, a teacher of English of Class VIII may be deputed to be an External Examiner for Class X).

Award of Marks	**(20 Marks)**
Listening Skills:	10 marks
Speaking Skills:	10 marks

The total marks obtained out of 20 are to be sent to the CISCE by the Head of the School.

The Head of the School will be responsible for the online entry of marks on the CISCE's CAREERS portal by the due date. Schools are required to maintain a record of all assessments conducted in **Listening and Speaking Skills** for candidates of Classes IX and X. These include copies of the assessment tests, topics for presentation and marks awarded. The record will be maintained for a period of 2 months after the ICSE (10) examinations of the candidates concerned.

Paper 2 - Literature in English

Schools will set, assess and record written assignments by the candidates as given below:

Class IX: *Two or three assignments of approximately 300 to 400 words each.*

NOTE: Students should be encouraged to work in pairs/small groups to develop skills of collaboration and cooperation.

Class X: *Two or three assignments of reasonable length (not exceeding 1500 words in total).*

SUGGESTED ASSIGNMENTS

Assignments should be based on the prescribed textbooks on the following lines:

(i) Character/thematic analysis;

(ii) Socio-economic, cultural, historical relevance / background;

(iii) Summary / paraphrase.

(iv) Appreciation of literary qualities.

(v) Identifying with a character. Putting oneself in the place of a character in given circumstances and explaining one's actions.

(vi) Imagine alternative outcomes or endings in a literary piece and the effect on all concerned.

(vii) Making a graphic representation of a scene/story/ poem.

(viii) Assume the persona of one of the characters (from the play/ poem/story) and record a diary entry of a particular incident/episode.

EVALUATION

The assignments/projects are to be evaluated by the subject teacher and by an external examiner. (The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the section/class**. For example, a teacher of English of Class VIII may be deputed to be an External Examiner for Class X, English projects.)

The Internal Examiner and the External Examiner will assess the assignments independently.

Award of Marks	**(20 Marks)**
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to the CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on the CISCE's CAREERS portal by the due date.

INTERNAL ASSESSMENT IN ENGLISH LANGUAGE-GUIDELINES FOR MARKING WITH GRADES - AURAL ASSIGNMENT (CLASSES IX & X)

Grade	Understanding/ Comprehension Main Idea, Central Theme	Recall	Vocabulary	Context/ Correlation to Other Areas	Marks
I	The candidate accurately understands the central idea of the passage as well as the relevant points in the selected passage/ talk.	The candidate recalls all the important points made (written/ verbal).	The candidate uses appropriate and correct vocabulary while recalling the points made.	The candidate clearly understands the context and can widely correlate the passage to the other areas.	3
II	The candidate gives ideas fairly close to the central / main idea of the passage as well as understands some of the relevant points heard in the selected passage/ talk.	The candidate recalls some of the important points made (written/ verbal).	The candidate uses correct but simple vocabulary while recalling the points made.	The candidate can moderately understand the context of the passage and can moderately correlate the passage to the other areas.	2
III	The candidate cannot fully comprehend the passage and gives only a few ideas related to the central theme of the passage.	The candidate recalls very few of the important points made (written/verbal).	The candidate makes various errors in vocabulary while recalling the points made.	The candidate can only faintly understand the context of the passage and relate it to the other areas.	1
IV	The candidate is neither able to understand the central/main idea of the passage; nor able to understand relevant points heard in the passage/talk.	The candidate is unable to recall the important points made (written/verbal)	The candidate uses incorrect vocabulary while recalling the points made.	The candidate is unable to understand the context of the passage and is unable to correlate the passage to the other areas.	0

INTERNAL ASSESSMENT IN ENGLISH LANGUAGE - GUIDELINES FOR MARKING WITH GRADES - ORAL ASSIGNMENT (CLASSES IX & X)

Grade	Fluency of Language	Subject Matter	Organization	Vocabulary/ Delivery	Understanding	Gesture	Marks
I	Speaks with fluency and has full operational command over the language.	Matter is relevant, rich in content and original.	Content is well sequenced and well organized.	Uses appropriate vocabulary and pronounces words correctly.	While speaking, the candidate emphasizes the important points.	Uses natural and spontaneous gestures that are not out of place.	3
II	The candidate speaks with fairly good fluency and has reasonable operational command of the language.	The subject matter is mostly relevant, consisting of a few original ideas.	The content is satisfactorily sequenced and well organized.	The candidate pronounces most words correctly and uses simple vocabulary.	While speaking, the candidate emphasizes most important points.	Uses some natural gestures.	2
III	The candidate speaks with poor fluency and does not communicate except for the most basic information.	The subject matter is irrelevant and lacks originality.	The subject content is very poor and lacks organisational structure.	The candidate pronounces many words incorrectly and uses inappropriate vocabulary.	While speaking, the candidate emphasizes some important points.	Uses very few natural gestures.	1
IV	The candidate cannot communicate even the most basic information.	The subject matter is negligible.	The subject content comprises of mere words with no structured sentences.	The candidate is unable to correctly pronounce most words and has a limited vocabulary.	While speaking, the candidate is unable to emphasize important points.	Uses no natural gestures.	0

INTERNAL ASSESSMENT IN LITERATURE IN ENGLISH -GUIDELINES FOR MARKING WITH GRADES (CLASSES IX & X)

Grade	Understanding of Text (Narrative)	Examples from Text	Understanding of text- Interpretation and Evaluation	Appreciation of Language, Characterization	Critical Appreciation - Personal Response	Marks
I	The candidate demonstrates expertise in giving an appropriate account of the text, with well-chosen reference to narrative and situation.	The account is suitably supported by relevant examples from the text.	The candidate understands the text with due emphasis on interpretation and evaluation.	The candidate appreciates and evaluates significant ways (structure, character, imagery) in which writers have achieved their effects.	The candidate is able to effectively reflect personal response (critical appreciation) to the text.	4
II	The candidate demonstrates a high level of competence in giving an account of the text, with appropriate references to the narrative and situation.	The account is supported by examples from the text.	The candidate understands text with some emphasis on interpretation and evaluation.	The candidate appreciates and evaluates significant ways in which writers have achieved their effects.	The candidate is able to reflect a personal response to the text.	3
III	The candidate demonstrates competence in giving an account of the text with some reference to the narrative and situation.	The candidate understands the text and shows a basic recognition of the theme and can support it by a few examples.	The candidate recognizes some aspects of the text used by authors to present ideas.	The candidate recognizes some of the significant ways in which the writers have used the language.	The candidate is able to communicate a personal response, which shows appreciation.	2
IV	The candidate gives a broad account of the text with reference to the narrative and situation.	The candidate understands the basic meaning of the text.	The candidate relates the text to other texts studied.	The candidate recognizes differences in the way authors write.	The candidate communicates a straightforward personal response to the text.	1
V	The candidate is unable to demonstrate an understanding of the basic events in the text.	The candidate is unable to understand the text or support it with any examples.	The candidate is unable to relate the text to the other texts studied.	The candidate is unable to recognize the differences in the way authors write.	The candidate is unable to give a personal view of the text studied.	0

SECOND LANGUAGE

Aims:

1. To appreciate the language as an effective means of communication.
2. To acquire knowledge of the elements of the language.
3. To develop an interest in the language.
4. To understand the language when spoken at normal conversational speed.
5. To understand the basic structural patterns of the language, vocabulary and constructions.

INDIAN LANGUAGES

CLASSES IX AND X

Papers will be set in the following languages:

Ao-Naga, Assamese, Bengali, Dzongkha, Garo, Gujarati, Hindi, Kannada, Kashmiri, Khasi, Kokborok, Lepcha, Malayalam, Manipuri, Marathi, Mizo, Nepali, Odia, Punjabi, Sanskrit, Tamil, Tangkhul, Telugu, Urdu, or any other language of an Indian community approved by CISCE.

*There will be one paper of **three** hours duration carrying 80 marks and Internal Assessment of 20 marks.*

The paper will be divided into two sections, Section A and Section B.

Section A: Language	*(40 Marks)*
Section B: Prescribed Texts	*(40 Marks)*

SECTION A: LANGUAGE - 40 Marks

This Section will be compulsory.

1. **Composition**: Candidates will be required to write one composition, in the language, which may include short explanations, directions, descriptions or narratives. There will be a choice of subjects, which will be varied and may be suggested by language or other stimuli such as pictures and objects.
2. **Letter**: Candidates will be required to write a letter from a choice of two subjects. Suggestions may be given. The layout of the letter with address, introduction, conclusion, etc., will form part of the assessment.
3. **Comprehension**: An unseen passage of about 250 words will be given in the language. Questions on the passage will be set for answers in the language, designed to test the candidates' understanding of the content of the passage.
4. **Grammar**: This will consist of tests in the use of language vocabulary, syntax and idioms, synthesis in sentence construction, formation of sentences in the language correctly embodying given words or forms. The question will not require any knowledge of grammatical terms.

SECTION B: PRESCRIBED TEXTS - 40 Marks

Candidates will be required to answer four questions from **ONLY two** of the prescribed textbooks. All questions will be set in the language and candidates will be required to answer in the language. The questions set will be designed to test the candidates' understanding of the subject matter of the prescribed books.

Note: For list of Prescribed Textbooks, see Appendix - I.

The Class X – ICSE examination paper will be set on the entire syllabus prescribed for the subject. The Class IX internal examination is to be conducted on the portion of this syllabus that is covered during the academic year**. *CISCE has not prescribed bifurcation of the syllabus prescribed for this subject.***

INTERNAL ASSESSMENT

Language and Literature:

Class IX: Two or three assignments of reasonable length/duration of which two should be written assignments – one from the language and one from the literature component of the syllabus.

Class X: Two or three assignments of reasonable length/duration of which two should be written assignments – one from the language and one from the literature component of the syllabus.

SUGGESTED ASSIGNMENTS

Language:

Class IX: ***Creative Writing:*** Students are to write short compositions (approximately 300 to 400 words each), the stimuli being:

(i) a piece of recorded music;

(ii) a recorded series of sounds;

(iii) a picture/photograph;

(iv) an opening sentence or phrase;

(v) a newspaper/magazine clipping or report;

One piece of factual writing which should be informative or argumentative; one piece of expressive writing which is descriptive and imaginative; preparation of film/book review.

Aural: Listening to a conversation/talk/reading of a short passage and then writing down the relevant or main points in the specified number of words and answering the given questions.

Class X: ***Oral:*** Prepared speech/ declamation; impromptu speech/ debate/ discussion; report/interview; elocution; role-play/general conversation on selected topics.

Creative Writing: Students are to write short compositions (approximately 300 to 400 words each), the stimuli being:

(i) a piece of recorded music;

(ii) a recorded series of sounds;

(iii) a picture/photograph;

(iv) an opening sentence or phrase;

(v) a newspaper/magazine clipping or report;

One piece of factual writing which should be informative or argumentative; one piece of expressive writing which is descriptive and imaginative; preparation of film/book review.

Literature (Prescribed Texts):

Classes IX and X

Assignments should be based on the prescribed textbooks on the following lines:

(i) Character/thematic analysis.

(ii) Socio-economic, cultural, historical relevance / background.

(iii) Summary / paraphrase.

EVALUATION

The assignments/project work are to be evaluated by the subject teacher and by an External Examiner. (The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the section/class**. For example, a teacher of the language of Class VIII may be deputed to be an External Examiner for Class X projects in the language.)

The Internal Examiner and the External Examiner will assess the assignments independently.

Award of Marks	**(20 Marks)**
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on the CISCE's CAREERS portal by the due date.

INTERNAL ASSESSMENT IN INDIAN LANGUAGES - GUIDELINES FOR MARKING WITH GRADES - CREATIVE WRITING (CLASSES IX & X)

Grade	Content/Analysis of Idea, Thought/ Feeling.	Expression/ Effective Expression of Idea	Structure/ Organisation of Material	Vocabulary/ Use of Words, Phrases	Originality/ Imaginative/ Innovative	Marks
I	The candidate analyses the ideas, feelings and experiences effectively. Reasoning is logical and effective.	The candidate expresses the ideas, thoughts and feelings effectively.	The work is very well structured with a sense of introduction, body, middle and conclusion, paragraphing and appropriate sentence construction.	The use of vocabulary exhibits a high level of competence in handling language.	The work is imaginative, interesting and engrossing.	4
II	The candidate analyses the ideas, feelings and experiences with well-defined explanations, reasoning is logical and persuasive.	The candidate expresses the ideas, thoughts and feelings well and with clarity.	The work is very well structured with some sense of conclusion and of paragraph lengths.	The vocabulary exhibits competence of word usage; correctness of grammar and spelling.	The candidate's work is quite interesting and engrossing.	3
III	The candidate analyses the ideas, feelings and experiences with a fair degree of detail and explanation. Reasoning is fairly logical and persuasive.	The candidate expresses the ideas, thoughts and feelings fairly well and with a fair degree of clarity.	The work is fairly well structured; candidate follows simple paragraphing.	The candidate uses straightforward vocabulary and fairly good pattern of spellings.	The candidate demonstrates the ability to sustain the interest of the reader.	2
IV	The candidate attempts to analyze ideas, feelings and experiences with simple explanation and detail. Reasoning and arguments are not very convincing.	The candidate expresses the ideas, thoughts and feelings intelligibly and in simple language.	The work shows some understanding of paragraphing and structure.	The candidate's vocabulary is limited and the spelling, punctuation and grammar is sometimes poor.	The candidate is, to some extent, able to sustain the interest of the reader.	1
V	The candidate attempts a basic analysis of ideas, feelings and experiences with few simple explanations and few details. Is unable to present proper arguments.	The candidate is unable to expresses the ideas, thoughts and feelings, uses simple language and the work is not very intelligible.	The candidate does not display an understanding of structure and paragraphing.	There is consistent weakness in spelling, punctuation and grammar.	The candidate is unable to sustain the interest of the reader.	0

INTERNAL ASSESSMENT IN INDIAN LANGUAGES - GUIDELINES FOR MARKING WITH GRADES-AURAL ASSIGNMENT (CLASS IX)

Grade	Understanding/ Comprehension Main Idea, Central Theme	Recall	Vocabulary	Context/ Correlation to Other Areas	Marks
I	The candidate accurately understands the central idea of the passage as well as the relevant points in the selected passage/ talk.	The candidate recalls all the important points made (written/ verbal).	The candidate uses appropriate and correct vocabulary while recalling the points made.	The candidate clearly understands the context and can widely correlate the passage to the other areas.	3
II	The candidate gives ideas fairly close to the central / main idea of the passage as well as understand some of the relevant points heard in the selected passage/ talk.	The candidate recalls some of the important points made (written/ verbal).	The candidate uses correct but simple vocabulary while recalling the points made.	The candidate can moderately understand the context of the passage and can moderately correlate the passage to the other areas.	2
III	The candidate cannot fully comprehend the passage and gives only a few ideas related to the central theme of the passage.	The candidate recalls very few of the important points made (written/verbal).	The candidate makes various errors in vocabulary while recalling the points made.	The candidate can only faintly understand the context of the passage and relate it to the other areas.	1
IV	The candidate is neither able to understand the central/main idea of the passage; nor able to understand relevant points heard in the passage/talk.	The candidate is unable to recall the important points made (written/verbal)	The candidate uses incorrect vocabulary while recalling the points made.	The candidate is unable to understand the context of the passage and is unable to correlate the passage to the other areas.	0

INTERNAL ASSESSMENT IN INDIAN LANGUAGES - GUIDELINES FOR MARKING WITH GRADES- ORAL ASSIGNMENT (CLASS X)

Grade	Fluency of Language	Subject Matter	Organization	Vocabulary/ Delivery	Understanding	Gesture	Marks
I	Speaks with fluency and has full operational command over the language.	Matter is relevant, rich in content and original.	Content is well sequenced and well organized.	Uses appropriate vocabulary and pronounces words correctly.	While speaking, the candidate emphasizes the important points.	Uses natural and spontaneous gestures that are not out of place.	3
II	The candidate speaks with fairly good fluency and has reasonable operational command of the language.	The subject matter is mostly relevant, consisting of a few original ideas.	The content is satisfactorily sequenced and well organized.	The candidate pronounces most words correctly and uses simple vocabulary.	While speaking the candidate emphasizes most important points.	Uses some natural gestures.	2
III	The candidate speaks with poor fluency and does not communicate except for the most basic information.	The subject matter is irrelevant and lacks originality.	The subject content is very poor and lacks organisational structure.	The candidate pronounces many words incorrectly and uses inappropriate vocabulary.	While speaking, the candidate emphasizes some important points.	Uses very few natural gestures.	1
IV	The candidate cannot communicate even the most basic information.	The subject matter is negligible.	The subject content comprises of mere words with no structured sentences.	The candidate is unable to correctly pronounce most words and has a limited vocabulary.	While speaking, the candidate is unable to emphasize important points.	Uses no natural gestures.	0

INTERNAL ASSESSMENT IN INDIAN LANGUAGES (LITERATURE - PRESCRIBED TEXTS) - GUIDELINES FOR MARKING WITH GRADES (CLASSES IX & X)

Grade	Understanding of Text (Narrative)	Examples from Text	Understanding of text- Interpretation and Evaluation	Appreciation of Language, Characterization	Critical Appreciation -Personal Response	Marks
I	The candidate demonstrates expertise in giving an appropriate account of the text, with well-chosen reference to narrative and situation.	The account is suitably supported by relevant examples from the text.	The candidate understands the text with due emphasis on interpretation and evaluation.	The candidate appreciates and evaluates significant ways (structure, character, imagery) in which writers have achieved their effects.	The candidate is able to effectively reflect personal response (critical appreciation) to the text.	4
II	The candidate demonstrates a high level of competence in giving an account of the text, with appropriate references to the narrative and situation.	The account is supported by examples from the text.	The candidate understands the text with some emphasis on interpretation and evaluation.	The candidate appreciates and evaluates significant ways in which writers have achieved their effects.	The candidate is able to reflect a personal response to the text.	3
III	The candidate demonstrates competence in giving an account of the text with some reference to the narrative and situation.	The candidate understands the text and shows a basic recognition of the theme and can support it by a very few examples.	The candidate recognizes some aspects of the text used by authors to present ideas.	The candidate recognizes some of the significant ways in which the writers have used the language.	The candidate is able to communicate a personal response which shows appreciation.	2
IV	The candidate gives broad account of the text with reference to the narrative and situation.	The candidate understands the basic meaning of the text.	The candidate relates the text to other texts studied.	The candidate recognizes differences in the way authors write.	The candidate communicates straight forward personal response to the text.	1
V	The candidate is unable to demonstrate an understanding of the basic events in the text.	The candidate is unable to understand the text or support it with any examples.	The candidate is unable to relate to the other text studied.	The candidate is unable to recognize the differences in the way authors write.	The candidate is unable to give a personal view of the text studied.	0

HISTORY, CIVICS AND GEOGRAPHY (50)

HISTORY AND CIVICS

H.C.G. - Paper - 1

Candidates offering History, Civics and Geography (Thailand) are not eligible to offer History, Civics and Geography.

Aims:

1. To provide an understanding of the working of the Indian government necessary for the students to grow into responsible, enlightened citizens in a secular democracy.
2. To enrich the understanding of those aspects of Indian historical development which are crucial to the understanding of contemporary India.
3. To awaken a desirable understanding in pupils of the various streams which have contributed to the development and growth of the Indian nation and its civilisation and culture.
4. To develop a world historical perspective of the contributions made by various cultures to the total heritage of mankind.

CLASS IX

*There will be **one** paper of **two** hours duration carrying 80 marks and an Internal Assessment of 20 marks.*

SECTION A: CIVICS

An elementary study is required of this section without verbatim study of the Constitutional Articles in detail.

1. Our Constitution

Definition of Constitution - date of adoption, date of enforcement and its significance. Features: Single Citizenship, Universal Adult Franchise, Fundamental Rights and Fundamental Duties, Directive Principles of State Policy (meaning), Welfare State.

2. Elections

Meaning; Composition of Election Commission (in brief); Direct and Indirect election; General election; Mid-term election and By-election.

3. Local Self Government

(i) Rural: Three-tier system of Panchayati Raj – Gram Panchayat, Panchayat Samiti, Zila Parishad – their meaning and functions.

(ii) Urban: Municipal Committees and Municipal Corporations – meaning and functions.

SECTION B: HISTORY

1. The Harappan Civilisation

Sources: Great Bath, Citadel, seals, bearded man, dancing girl, dockyard, script.

Origin, extent, urban planning, trade, art & craft, and its decline.

2. The Vedic Period

Sources: Vedas and Epics (brief mention); Iron Artifacts and Pottery.

Brief comparative study of Early and Later Vedic society and economy.

3. Jainism and Buddhism

Sources: Angas, Tripitikas and Jatakas (brief mention).

Causes for their rise in the 6th century B.C.; Doctrines.

4. The Mauryan Empire

Sources: Arthashastra, Indika, Ashokan Edicts, Sanchi Stupa.

Political history and administration (Chandragupta Maurya and Ashoka); Ashoka's Dhamma.

5. The Sangam Age

Sources: Tirukkural and Megaliths.

A brief study of society and economy.

6. The Age of the Guptas

Sources: Account of Fa-hien; *Allahabad Pillar Inscription.*

Political history and administration (Samudragupta and Chandragupta Vikramaditya); Contribution to the fields of Education (Nalanda University), Science (Aryabhatta) and Culture (works of Kalidasa, Deogarh temple).

7. Medieval India

(a) The Cholas

Sources: Inscriptions; Brihadishwara Temple.

Political history and administration (Rajaraja I, Rajendra I).

(b) The Delhi Sultanate

Sources: Inscriptions; Qutab Minar.

Political history and administration (Qutbuddin Aibak, Alauddin Khilji and Muhammad Bin Tughlaq).

(c) The Mughal Empire

Sources: Ain-i-Akbari, Taj Mahal, Jama Masjid and Red Fort.

Political history and administration (Babur, Akbar and Aurangzeb).

(d) Composite Culture

Sources: Bijak, Guru Granth Sahib, Ajmer Sharief, St. Francis Assisi Church (Kochi).

Significance of Bhakti Movements and Sufism (Mirabai, Sant Jnaneswar and Hazrat Nizamuddin). Influence of Christianity (St. Francis Xavier).

8. The Modern Age in Europe

(a) Renaissance

Definition, causes (capture of Constantinople, decline of Feudalism, new trade routes, spirit of enquiry and invention of the printing press) and impact on art, literature and science (Leonardo Da Vinci, William Shakespeare and Copernicus).

(b) Reformation

Causes of reformation (dissatisfaction with the practices of the Catholic Church and new learning); Martin Luther's contribution, Counter Reformation.

(c) Industrial Revolution

Definition of the term. Comparative study of Socialism and Capitalism.

INTERNAL ASSESSMENT

Any **one** project/assignment related to the syllabus.

Suggested Assignments

- 'The Indian constitution protects the rights of children, women, minorities and weaker sections.' Elaborate on the basis of a case study.
- 'Fundamental Duties complement Fundamental Rights.' Illustrate with the help of a Power Point Presentation.
- Highlight the civic issues of your locality and what suggestions would you offer to address them.
- Visit a museum or local site of historical importance and discuss its significance.
- Discuss the art and architectural features of any of these monuments: Buddhist Caves, Ajanta; Iron Pillar, Mehrauli; Gol Gumbaz, Bijapur; Mattancherry Synagogue, Cochin; Kamakhya Temple, Guwahati; St. Thomas Basilica, Chennai; Tower of Silence, Mumbai.
- Make a pictorial presentation of inventions and innovations as a result of the Industrial Revolution.
- Make a comparative study of the Harappan and the Mesopotamian Civilisations.

CLASS X

*There will be **one** paper of **two** hours duration carrying 80 marks and an Internal Assessment of 20 marks.*

SECTION A: CIVICS

1. The Union Legislature

Meaning of the federal setup in India.

(i) Lok Sabha - term, composition, qualifications for membership. Parliamentary procedures: a brief idea of sessions, quorum, question hour, adjournment and no-confidence motion. Speaker – election and functions.

(ii) Rajya Sabha – composition, qualifications for membership, election, term, Presiding Officer.

Powers and functions of Union Parliament – (legislative, financial, judicial, electoral, amendment of the Constitution, control over executive). Exclusive powers of the two Houses.

2. The Union Executive

(a) The President:

Qualifications for election, composition of Electoral College, reason for indirect election, term of office, procedure for impeachment.

Powers (executive, legislative, financial, judicial, discretionary and emergency)

(b) The Vice-President:

Qualifications for election, term of office and powers.

(c) Prime Minister and Council of Ministers: *Appointment, formation of Council of Ministers, tenure, functions - policy making, administrative, legislative, financial, emergency. Position and powers of the Prime Minister. Collective and individual responsibility of the members of the Cabinet. Distinction between the Council of Ministers and the Cabinet.*

3. The Judiciary

(a) The Supreme Court:

Composition, qualifications of judges, appointment, independence of judiciary from the control of executive and legislature; Jurisdiction and functions: Original, Appellate, Advisory, Revisory, Judicial Review and Court of Record. Enforcement of Fundamental Rights and Writs.

(b) The High Courts:

Composition, qualifications of judges, appointment; Jurisdiction and functions: Original, Appellate, Revisory, Judicial Review and Court of Record. Enforcement of Fundamental Rights and Writs.

(c) Subordinate Courts:

Distinction between Court of the District Judge and Sessions Court.

Lok Adalats: meaning and advantages.

SECTION B: HISTORY

1. The Indian National Movement (1857 - 1917)

(a) The First War of Independence, 1857

Only the causes (political, socio-religious, economic and military) and consequences will be tested. [The events, however, need to be mentioned in order to maintain continuity and for a more comprehensive understanding.]

(b) Factors leading to the growth of Nationalism *– economic exploitation, repressive colonial policies, socio-religious reform movements (brief mention of contribution of Raja Rammohan Roy and Jyotiba Phule) and role of the Press*.

Foundation of the Indian National Congress - *the Indian National Association (Surendranath Banerjee) and the East India Association (Dadabhai Naoroji) as precursors. Immediate objectives of the Indian National Congress - the first two sessions and their Presidents should be mentioned.*

(c) First Phase of the Indian National Movement (1885-1907) - *objectives and methods of struggle of the Early Nationalists. Any two contributions of Dadabhai Naoroji, Surendranath Banerjee and Gopal Krishna Gokhale.*

Second Phase of the Indian National Movement (1905-1916) - *Brief mention of the causes of the Partition of Bengal and its perspective by the Nationalists. Brief mention*

of Surat Split of 1907; objectives and methods of struggle of the Radicals. Any two contributions of Bal Gangadhar Tilak, Bipin Chandra Pal and Lala Lajpat Rai. The Muslim League; Factors leading to the formation of the Muslim League and its objectives. Brief mention of the significance of the Lucknow Pact - 1916.

2. Mass Phase of the National Movement (1915-1947)

(a) Mahatma Gandhi - *Non-Cooperation Movement : causes (Khilafat Movement, Rowlatt Act, Jallianwala Bagh Tragedy), programme and suspension – Chauri Chaura incident and impact of the Movement; the Civil Disobedience Movement: causes (reaction to the Simon Commission, Declaration of Poorna Swaraj at the Lahore Session of 1929), Dandi March, programme and impact of the Movement, Gandhi-Irwin Pact and the Second Round Table Conference; the Quit India Movement: causes (failure of the Cripps Mission, Japanese threat), Quit India Resolution and the significance of the Movement.*

(b) Forward Bloc *(objectives)* and INA *(objectives and contribution of* Subhas Chandra Bose).

(c) Independence and Partition of India – *Cabinet Mission Plan (clauses only); Mountbatten Plan (clauses and its acceptance); and the Indian Independence Act of 1947 (clauses only).*

3. The Contemporary World

(a) The First World War

Causes (Nationalism and Imperialism, Armament Race, division of Europe and Sarajevo crisis) and Results (Treaty of Versailles, territorial rearrangements, formation of League of Nations).

(b) Rise of Dictatorships

Causes for the rise of Fascism in Italy and the rise of Nazism in Germany. A comparative study of Mussolini's Fascist and Hitler's Nazi ideologies.

(c) The Second World War

Causes (Dissatisfaction with the Treaty of Versailles, Rise of Fascism and Nazism, Policy of Appeasement, Japanese invasion of China, Failure of League of Nations and Hitler's invasion of Poland). Brief mention of the attack on Pearl Harbour and bombing of Hiroshima and Nagasaki. Consequences (Defeat of Axis Powers, Formation of the United Nations and Cold War).

(d) United Nations

(i) The objectives of the U.N.

The composition and functions of the General Assembly, the Security Council, and the International Court of Justice.

(ii) Major agencies of the United Nations: *UNICEF, WHO and UNESCO - functions only*.

(e) Non-Aligned Movement

Brief meaning; objectives; Panchsheel; role of Jawaharlal Nehru; Names of the architects of NAM.

INTERNAL ASSESSMENT

Any one project/assignment related to the syllabus.

Suggested Assignments

- Compare the Parliamentary and Presidential forms of Government with reference to India and the U.S.A.
- Conduct a mock Court and record the proceedings.
- Present a life sketch and contributions of any one of the following Presidents of India –
- Dr. Rajendra Prasad, Dr. S. Radhakrishnan and Dr. A.P.J. Abdul Kalam (or any other).
- Present a book review of any one of the following works: Dadabai Naoroji's 'Poverty and un-British rule in India', Gandhi's 'The Story of my Experiments with Truth', Nehru's 'Discovery of India', Bhagat Singh's 'Why I am an Atheist', Vijayalakshmi Pandit's 'The Scope of Happiness: A Personal Memoir', Abdul Kalam's 'Wings of Fire'.
- Discuss the relevance of any one of the following films to understand the history of 20th Century Europe: The Book Thief, Schindler's List, Escape to Victory, The Boy in Striped Pyjamas, Life is Beautiful, The Sound of Music, Gandhi (Richard Attenborough), Sardar (Ketan Mehta), Netaji Subhas Chandra Bose - The Forgotten Hero (Shyam Benegal).

- Highlight the work and achievements of any one Nobel Laureate - Malala Yousafzai or Kailash Satyarthi.
- Make a PowerPoint presentation on India's Independence and Partition.
- Make a presentation on the influence of Gandhian principles on Martin Luther King / Nelson Mandela.
- Prepare a report on the contributions of any one of the following agencies of the United Nations – UNESCO / WHO / UNICEF / ILO / UNDP / FAO.
- Present a case study of any recent human rights violations and redressal mechanisms available to prevent such instances in the future.

EVALUATION

The assignments/project work is to be evaluated by the subject teacher and by an External Examiner. (The External Examiner may be a teacher nominated by the Head of the School, who could be from the faculty, **but not teaching the subject in the section/class**. For example, a teacher of History of Class VIII may be deputed to be an External Examiner for Class X, History projects.)

The Internal Examiner and the External Examiner will assess the assignments independently.

Award of Marks	**(20 Marks)**
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to CISCE by the Head of the School.

The Head of the school will be responsible for the online entry of marks on CISCE's CAREERS portal by the due date.

INTERNAL ASSESSMENT IN HISTORY & CIVICS - GUIDELINES FOR MARKING WITH GRADES

Grade	Preparation/ Research	Information	Concepts	Thinking Skills	Presentation	Marks
I	▪ Follows instructions with understanding. ▪ Masters research techniques easily. ▪ Reference work is orderly.	▪ A good deal of relevant matter. ▪ Uses wide range of sources.	▪ Good understanding of historical concepts - sequence/ reconstruction- causes and consequences- continuity and change ▪ Empathy.	▪ Different interpretations of evidence. ▪ Can draw Inferences/ deductions/ conclusions.	▪ Matter presented is clear and is in coherent form (sub-headings, sections, chapters etc.) ▪ Work is neat and tidy and not over elaborate.	4
II	▪ Follows instructions but needs a little help in research techniques. ▪ Reference notes quite orderly.	▪ Selects matter relevant to context. ▪ Limited use of references/ sources.	▪ Understanding of concepts is adequate.	▪ Limited / Single interpretation of evidence with some examples. ▪ Some inferences/ conclusions are drawn.	▪ Matter is presented in coherent form but not organized into sections etc. ▪ Presentation neat and tidy but not elaborate.	3
III	▪ Follows instructions but needs constant guidance. ▪ Reference notes at times disorderly.	▪ Relevant matter but limited reference work. ▪ Matter is sketchy.	▪ Displays limited use of concepts.	▪ Few examples /single example to support reasoning.	▪ Work is presented in an orderly way, but not organized into sections. ▪ Over use of 'cosmetics' to hide lack of substance. ▪ Work is quite neatly presented.	2
IV	▪ Struggles with research methods and needs constant guidance. ▪ Reference notes copied without reference to keywords.	▪ Hardly any reference material. ▪ Use of irrelevant matter. ▪ Matter is sketchy.	▪ Minimal competency in concepts. ▪ A few of the required concepts.	▪ Finds it difficult to make conclusions/ deductions/ inferences. ▪ No examples to support reasoning.	▪ Matter presented in a confused way at times (no sub-headings, chapters, etc.) ▪ Tendency to copy from reference books. ▪ Use of "cosmetics" to hide lack of substance.	1
V	▪ Cannot follow instructions. ▪ Works 'blindly' without reference to keywords.	▪ No reference work/copied from other textbooks/ sketchy matter.	▪ Unable to demonstrate concepts.	▪ Unable to make inferences/ deductions or come to any conclusions.	▪ Matter presented in an incoherent/ disorganized way. ▪ Copied from textbooks "blindly". ▪ Use of "cosmetics" to hide lack of substance. ▪ Untidy work.	0

HISTORY, CIVICS AND GEOGRAPHY (50)

GEOGRAPHY

H.C.G. - Paper - 2

Candidates offering History, Civics and Geography (Thailand) are not eligible to offer History, Civics and Geography.

Aims:

1. To develop an understanding of terms, concepts and principles related to Geography.
2. To explain the cause- effect relationships of natural phenomena.
3. To understand the use of natural resources and development of regions.
4. To acquire knowledge of and appreciate the interdependence of nations and different regions of the world.
5. To know the availability of resources, understand, explain their uses and appreciate the problems of development in India.
6. To understand and encourage human efforts made to conserve and protect the natural environment.
7. To acquire practical skills related to the meaning and use of maps and their importance in the study of Geography.

CLASS IX

*There will be **one** paper of **two hours** duration carrying 80 marks and an Internal Assessment of 20 marks.*

Candidates will be expected to make the fullest use of sketches, diagrams, graphs and charts in their answers.

Questions may require answers involving the interpretation of photographs of geographical interest.

PRINCIPLES OF GEOGRAPHY

1. Our World

(i) Earth as a planet

Shape of the earth. Earth as the home of humankind and the conditions that exist.

(ii) Geographic grid - Latitudes & Longitudes

(a) *Concept of latitudes: main latitudes, their location with degrees, parallels of latitude and their uses.*

(b) *Concept of longitudes - Prime Meridian, time (local, standard and time zones, Greenwich Mean Time (GMT) and International Date Line (IDL). Eastern and Western hemisphere.*

(c) *Using latitudes and longitudes to find location. Calculation of time.*

(d) *Great Circles and their use.*

(iii) Rotation and Revolution

Rotation – direction, speed and its effects (occurrence of day and night, the sun rising in the east and setting in the west, Coriolis effect)

Revolution of the earth and its inclined axis – effects: the variation in the length of the day and night and seasonal changes with Equinoxes and Solstices.

2. Structure of the Earth

(i) Earth's Structure

Core, mantle, crust – meaning, extent and their composition.

(ii) Landforms of the Earth

Mountains, plateaus, plains (definition, types and their formation):

Mountains – fold, residual and block.

Plateaus – intermont and volcanic.

Plains – structural and depositional.

Examples from the world and India.

(iii) Rocks - difference between minerals and rocks, types of rocks: igneous, sedimentary, metamorphic, their characteristics and formation; rock cycle.

(iv) Volcanoes

Meaning, Types – active, dormant and extinct.

Effects – constructive and destructive.

Important volcanic zones of the world.

(v) Earthquakes

Meaning, causes and measurement.

Effects: destructive and constructive.

Earthquake zones of the World

(vi) Weathering and Denudation

Meaning, types and effects of weathering.

Types: Physical Weathering – block and granular disintegration, exfoliation;

Chemical Weathering–oxidation, carbonation, hydration and solution;

Biological Weathering – caused by humans, plants and animals.

Meaning and agents of denudation; work of river and wind.

Stages of a river course and associated land forms – V-shaped valley, waterfall, meander and delta.

Wind – deflation hollows and Sand dunes.

3. Hydrosphere

Meaning of hydrosphere.

Tides - formation and pattern.

Ocean Currents – their circulation pattern and effects. (Specifically of Gulf Stream, North Atlantic Drift, Labrador Current, Kuro Shio and Oya Shio.)

4. Atmosphere

(i) Composition and structure of the atmosphere.

Troposphere, Stratosphere, Ionosphere and Exosphere; Ozone in the Stratosphere, its depletion. Global warming and its impact.

(ii) Insolation

- *Meaning of insolation and terrestrial radiation.*
- *Factors affecting temperature: latitude, altitude, distance from the sea, slope of land, winds and ocean currents.*

(iii) Atmospheric Pressure and Winds.

- *Meaning and factors that affect atmospheric pressure.*
- *Major pressure belts of the world.*
- *Factors affecting direction and velocity of wind – pressure gradient, Coriolis Effect.*
- *Permanent winds – Trades, Westerlies and Polar Easterlies.*
- *Periodic winds - Land and Sea breezes, Monsoons.*
- *Local winds - Loo, Chinook, Foehn and Mistral.*
- *Variable winds - Cyclones and Anticyclones.*
- *Jet Streams- Meaning and importance.*

(iv) Humidity

- *Humidity – meaning and difference between relative and absolute humidity.*
- *Condensation – forms (clouds, dew, frost, fog and mist).*
- *Precipitation - forms (rain, snow, and hail).*
- *Types of rainfall – relief/orographic, convectional, cyclonic/ frontal with examples from the different parts of the world.*

5. Pollution

(a) Types - air, water (fresh and marine), soil, radiation and noise.

(b) Sources:

- *Noise: Traffic, factories, construction sites, loudspeakers, airports.*
- *Air: vehicular, industrial, burning of garbage.*
  Water: domestic and industrial waste.
- *Soil: chemical fertilizers, bio medical waste and pesticides.*
- *Radiation: X- rays; radioactive fallout from nuclear plants.*

(c) Effects - on the environment and human health.

(d) Preventive Measures

Carpools, promotion of public transport, no smoking zone, restricted use of fossil fuels, saving energy and encouragement of organic farming.

6. Natural Regions of the World

Location, area, climate, natural vegetation and human adaptation.

Equatorial region, Tropical grasslands, Tropical Deserts, Tropical Monsoon, Mediterranean, Temperate grasslands, Taiga and Tundra.

7. Map Work

On an outline map of the World, candidates will be required to locate, mark and name the following:

1. *The major **Natural Regions** of the world - Equatorial, Tropical Monsoon, Tropical Deserts, Mediterranean type, Tropical grasslands, Temperate grasslands, Taiga and Tundra.*
2. *The Oceans, Seas, Gulfs and Straits - all Major Oceans, Caribbean Sea, North Sea, Black Sea, Caspian Sea, South China Sea, Mediterranean Sea, Gulf of Carpentaria, Hudson Bay, Persian Gulf, Gulf of Mexico, Gulf of Guinea, Bering Strait, Strait of Gibraltar, Strait of Malacca.*
3. *Rivers – Mississippi, Colorado, Amazon, Paraguay, Nile, Zaire, Niger, Zambezi, Orange, Rhine, Volga, Danube, Murray, Darling, Hwang Ho, Yangtse Kiang, Ob, Indus, Ganga, Mekong, Irrawaddy, Tigris, Euphrates.*
4. *Mountains – Rockies, Andes, Appalachian, Alps, Himalayas, Pyrenees, Scandinavian Highlands, Caucasus, Atlas, Drakensburg, Khinghan, Zagros, Urals, Great Dividing Range.*
5. *Plateaus – Canadian Shield, Tibetan Plateau, Brazilian Highlands, Patagonian Plateau, Iranian Plateau, Mongolian Plateau.*

INTERNAL ASSESSMENT

PRACTICAL WORK/ PROJECT WORK

1. A record file having any **three** of the following exercises will be maintained. (The file will be evaluated out of 10 marks).

   (a) Uses of important types of maps.

   (b) Directions and how to identify them - an illustrative diagram.

   (c) Reading and using statement of scale, graphic scale and scale shown by representative fraction method. (No drawing work, only explaining their meanings).

   (d) Reading of one town guide map or an atlas map. (Recognising the symbols and colours used, identifying directions and distances).

   (e) Drawing and recognising forms of important contours viz. valleys, ridges, types of slopes, conical hill, plateau, escarpment and sea cliff.

   (f) Drawing at least one sketch map to organize information about visiting an important place, a zoo or a monument.

2. Candidates will be required to prepare a project report on any **one** topic. The topics for assignments may be selected from the list of suggested assignments given below. Candidates can also take up an assignment of their choice under any of the four broad areas given below. (The project will be evaluated out of 10 marks).

Suggested list of Assignments:

(a) **Weather records:** Maintaining and interpreting weather records as found in the newspaper for at least one season.

(b) **Collection of data from secondary sources: {**Using Modern techniques *i.e.*, Global Positioning System (GPS), Remote Sensing, Aerial Photography and Satellite imageries}**:** Preparing a Power Point presentation on current issues like – use of earth resources/ development activities/dangers of development and ecological disasters like droughts, earthquakes, volcanoes, floods, landslides cyclones and tornadoes in the world.

(c) **Physical Features:** Collection of data from primary and secondary sources or taking photographs and preparing notional sketches of features found in the vicinity or areas visited during the year as a part of school activity.

(d) Find out the sources of pollution of water bodies in the locality and determine the quality of water.

(e) Collect information on global environmental issues and problems and communicate your findings through appropriate modes (posters, charts, collages, cartoons, handouts, essays, street plays and PowerPoint presentation).

(f) **Area Studies:** Choosing any aspect from World Studies and preparing a Power Point presentation or a write up on it.

(g) **Meteorological Instruments and their uses:** Six's maximum and minimum thermometer, mercury barometer, aneroid barometer, wind vane, anemometer, rain gauge and hygrometer.

CLASS X

*There will be **one** paper of **two** hours duration carrying 80 marks and Internal Assessment of 20 marks.*

Candidates will be expected to make the fullest use of sketches, diagrams, graphs and charts in their answers.

Questions set may require answers involving the interpretation of photographs of geographical interest.

PART – I

MAP WORK

1. Interpretation of Topographical Maps

(a) *Locating features with the help of a four figure or a six-figure grid reference.*

(b) *Definition of contour and contour interval. Identification of landforms marked by contours (steep slope, gentle slope, hill, valley, ridge / water divide, escarpment), triangulated height, spot height, bench mark, relative height/ depth.*

(c) *Interpretation of colour tints and conventional symbols used on a topographical survey of India map.*

(d) *Identification and definition of types of scale given on the map.*

Measuring distances and calculating area using the scale given therein.

(e) *Marking directions between different locations, using eight cardinal points.*

(f) *Identify: Site of prominent villages and/or towns, types of land use / land cover and means of communication with the help of the index given at the bottom of the sheet.*

(g) *Identification of drainage (direction of flow and pattern) and settlement patterns.*

(h) *Identification of natural and man-made features.*

2. Map of India

On an outline map of India, candidates will be required to locate, mark and name the following:

***Mountains, Peaks and Plateaus:** Himalayas, Karakoram, Aravali, Vindhyas, Satpura, Western and Eastern Ghats, Nilgiris, Garo, Khasi, Jaintia, Mount Godwin Austin (K2), Mount Kanchenjunga. Deccan Plateau, Chota Nagpur Plateau.*

***Plains:** Gangetic Plains and Coastal plains – (Konkan, Kanara, Malabar, Coromandel, Northern Circars).*

***Desert:** Thar (The Great Indian Desert)*

***Rivers:** Indus, Ravi, Beas, Chenab, Jhelum, Satluj, Ganga, Yamuna, Ghaghra, Gomti, Gandak, Kosi, Chambal, Betwa, Son, Damodar, Brahmaputra, Narmada, Tapti, Mahanadi, Godavari, Krishna, Cauveri, Tungabhadra.*

***Water Bodies:** Gulf of Kutch, Gulf of Khambhat, Gulf of Mannar, Palk Strait, Andaman Sea, Chilka Lake, Wular Lake.*

***Passes:** Karakoram, Nathu-La Passes.*

***Latitude and Longitudes:** Tropic of Cancer, Standard Meridian (82°30'E).*

***Direction of Winds**: South West Monsoons (Arabian Sea and Bay of Bengal Branches), North East Monsoons and Western Disturbances.*

***Distribution of Minerals**: Oil - Mumbai High (Offshore Oil Field) and Digboi. Iron – Singhbhum, Coal – Jharia.*

***Soil Distribution** – Alluvial, Laterite, Black and Red Soil.*

***Cities -** Delhi, Mumbai, Kolkata, Chennai, Hyderabad, Bengaluru, Kochi, Chandigarh, Srinagar, Vishakhapatnam, Allahabad.*

***Population -** Distribution of Population (Dense and sparse).*

PART - II

GEOGRAPHY OF INDIA

3. Location, Extent and Physical features

- *Position and Extent of India. (through Map only).*
- *The physical features of India – mountains, plateaus, plains and rivers. (through Map only).*

4. Climate

Distribution of Temperature, Rainfall, winds in Summer and Winter and factors affecting the climate of the area. Monsoon and its mechanism. Seasons: March to May – Summer; June to September – Monsoon; October to November - Retreating Monsoon. December to February – Winter.

5. Soil Resources

- *Types of soil (alluvial, black, red and laterite) distribution, composition and characteristics such as colour, texture, minerals and crops associated.*
- *Soil Erosion – causes, prevention and conservation.*

6. Natural Vegetation

- *Importance of forests.*
- *Types of vegetation (tropical evergreen, tropical deciduous, tropical desert, littoral and mountain), distribution and correlation with their environment.*
- *Forest conservation.*

7. Water Resources

- *Sources (Surface water and ground water).*
- *Need for conservation and conservation practices (Rain water harvesting and its importance).*
- *Irrigation: Importance and methods.*

8. Mineral and Energy Resources

- *Iron ore, Manganese, Copper, Bauxite – uses and their distribution.*
- *Conventional Sources: Coal, Petroleum, Natural gas (distribution, advantages and disadvantages).*
- *Hydel power (Bhakra Nangal Dam and Hirakud).*
- *Non-conventional Sources: Solar, wind, tidal, geo-thermal, nuclear and bio-gas (generation and advantages).*

9. Agriculture

- *Indian Agriculture – importance, problems and reforms.*
- *Types of farming in India: subsistence and commercial: shifting, intensive, extensive, plantation and mixed.*
- *Agricultural seasons (rabi, kharif, zayad).*
- *Climatic conditions, soil requirements, methods of cultivation, processing and distribution of the following crops:*
  - *rice, wheat, millets and pulses.*
  - *sugarcane, oilseeds (groundnut, mustard and soya bean).*
  - *cotton, jute, tea and coffee.*

10. Manufacturing Industries

Importance and classification

- *Agro based Industry - Sugar, Textile (Cotton and Silk).*
- *Mineral based Industry – Iron & Steel (TISCO, Bhilai, Rourkela, Vishakhapatnam) Petro Chemical and Electronics.*

11. Transport

Importance and Modes – Roadways, Railways, Airways and Waterways –- Advantages and disadvantages.

12. Waste Management

- *Impact of waste accumulation - spoilage of landscape, pollution, health hazards, effect on terrestrial, aquatic (fresh water and marine) life.*
- *Need for waste management.*
- *Methods of safe disposal - segregation, dumping and composting.*
- *Need and methods for reducing, reusing and recycling waste.*

INTERNAL ASSESSMENT

PRACTICAL / PROJECT WORK

Candidates will be required to prepare a project report on any **one** topic. The topics for assignments may be selected from the list of suggested assignments given below. Candidates can also take up an assignment of their choice under any of the broad areas given below.

Suggested list of assignments:

1. Local Geography:
   (a) Land use pattern in different regions of India– a comparative analysis.
   (b) The survey of a local market on the types of shops and services offered.
2. Environment:
   Wildlife conservation efforts in India.
3. Current Geographical Issues:
   Development of tourism in India.
4. Transport in India**:**
   Development of Road, Rail, Water and Air routes.
5. List different type of industries in the States and collect information about the types of raw materials used, modes of their procurement and disposal of wastes generated. Classify these industries as polluting or environment friendly and suggest possible ways of reducing pollution caused by these units.
6. Need for industrialization in India, the latest trends and its impact on economy of India.
7. Visit a water treatment plant, sewage treatment plant or garbage dumping or vermicomposting sites in the locality and study their working.

EVALUATION

The assignments/project work is to be evaluated by the subject teacher and by an External Examiner. (The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the section/class**. For example, a teacher of Geography of Class VIII may be deputed to be an External Examiner for Class X, Geography projects.)

The Internal Examiner and the External Examiner will assess the assignments independently.

Award of Marks	**(20 Marks)**
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on CISCE's CAREERS portal by the due date.

INTERNAL ASSESSMENT IN GEOGRAPHY - GUIDELINES FOR MARKING WITH GRADES

Criteria	Preparation	Procedure/ Testing	Observation	Inference/Results	Presentation
Grade I (4 marks)	Gives complete theoretical information using relevant geographical terms	States the objectives and defines the aspects to be studied.	Studies text and source material and makes a list.	States theoretical information in a coherent and concise manner using geographical terminology. Uses a variety of techniques. Shows resourcefulness. Supports investigation with relevant evidence.	Neatly and correctly stated statement of intent and conclusion matches with objectives.
Grade II (3 marks)	Provides adequate information using appropriate terms.	States objectives but not the limitations of the study.	Makes a limited list of source material only from secondary sources.	Uses sound methodology-using methods suggested. Makes a valid statement about the data collected. Attempts to develop explanations using available information.	Limited use of reference material and a presentation, which is routine.
Grade III (2 marks)	States objectives using some geographical terms but mostly in descriptive terms.	Only lists the aspects to be studied.	References are minimal.	Uses methodology in which selective techniques are applied correctly. Makes descriptive statement. Analysis is limited. Relates and describes systematically the data collected. Tries to relate conclusion to original aim.	Simple and neat with correct placement of references, acknowledgements, contents, maps and diagrams.
Grade IV (1 mark)	States intent without using relevant geographical terms but explaining them correctly.	Shows evidence of what to look for and how to record the same.	Uses methodology with some techniques but is unable to systematically record data and collect information.	Makes few relevant statements. Does analyse data that is not presented or tends to copy analysis available from other sources. Makes superficial conclusions. Link between the original aim and conclusion is not clear.	Neat but lacking in correct placement of table of contents, maps, diagrams and pictures.
Grade V (0 marks)	Does not make any use of geographical terms.	Has not collected any relevant data and has not presented sources correctly.	Does not use any logical technique and does not follow the methodology suggested.	Does not analyse data. Does not use the suggested methods. Makes conclusions but does not relate them to the original aim.	Presents the report without reference.

MATHEMATICS (51)

Aims:

1. To acquire knowledge and understanding of the terms, symbols, concepts, principles, processes, proofs, etc. of mathematics.
2. To develop an understanding of mathematical concepts and their application to further studies in mathematics and science.
3. To develop skills to apply mathematical knowledge to solve real life problems.
4. To develop the necessary skills to work with modern technological devices such as calculators and computers in real life situations.
5. To develop drawing skills, skills of reading tables, charts and graphs.
6. To develop an interest in mathematics.

CLASS IX

*There will be **one** paper of **two and a half** hours duration carrying 80 marks and Internal Assessment of 20 marks.*

Certain questions may require the use of Mathematical tables (Logarithmic and Trigonometric tables).

The solution of a question may require the knowledge of more than one branch of the syllabus.

1. Pure Arithmetic

Rational and Irrational Numbers

Rational, irrational numbers as real numbers, their place in the number system. Surds and rationalization of surds. Simplifying an expression by rationalizing the denominator. Representation of rational and irrational numbers on the number line.

Proofs of irrationality of $\sqrt{2}, \sqrt{3}, \sqrt{5}$

2. Commercial Mathematics

Compound Interest

(a) Compound interest as a repeated Simple Interest computation with a growing Principal. Use of this in computing Amount over a period of 2 or 3 years.

(b) Use of formula $A = P(1 + \frac{r}{100})^n$. Finding CI from the relation CI = A – P.

- *Interest compounded half-yearly included.*
- *Using the formula to find one quantity given different combinations of A, P, r, n, CI and SI; difference between CI and SI type included. Rate of growth and depreciation.*

Note: Paying back in equal installments, being given rate of interest and installment amount, **not included**.

3. Algebra

(i) Expansions

Recall of concepts learned in earlier classes.

$(a \pm b)^2$

$(a \pm b)^3$

$(x \pm a)\ (x \pm b)$

$(a \pm b \pm c)^2$

(ii) Factorisation

$a^2 - b^2$

$a^3 \pm b^3$

$ax^2 + bx + c$, *by splitting the middle term.*

(iii) Simultaneous Linear Equations in two variables. (With numerical coefficients only)

- *Solving algebraically by:*
  - *Elimination*
  - *Substitution and*
  - *Cross Multiplication method*
- *Solving simple problems by framing appropriate equations.*

(iv) Indices/ Exponents

Handling positive, fractional, negative and "zero" indices.

Simplification of expressions involving various exponents

$a^m \times a^n = a^{m+n}, a^m \div a^n = a^{m-n}, (a^m)^n = a^{mn}$

etc. Use of laws of exponents.

(v) Logarithms

(a) Logarithmic form vis-à-vis exponential form: interchanging.

(b) Laws of Logarithms and their uses.

Expansion of expression with the help of laws of logarithms

e.g. $y = \frac{a^4 \times b^2}{c^3}$

log y = 4 log a + 2 log b – 3 log c etc.

4. Geometry

(i) Triangles

(a) Congruency: four cases: SSS, SAS, AAS, and RHS. Illustration through cutouts. Simple applications.

(b) Problems based on:

- *Angles opposite equal sides are equal and converse.*
- *If two sides of a triangle are unequal, then the greater angle is opposite the greater side and converse.*
- *Sum of any two sides of a triangle is greater than the third side.*
- *Of all straight lines that can be drawn to a given line from a point outside it, the perpendicular is the shortest.*

Proofs not required.

(c) Mid-Point Theorem and its converse, equal intercept theorem

(i) Proof and simple applications of mid-point theorem and its converse.

(ii) Equal intercept theorem: proof and simple application.

(d) Pythagoras Theorem

Area based proof and simple applications of Pythagoras Theorem and its converse.

(ii) Rectilinear Figures

(a) Proof and use of theorems on parallelogram.

- *Both pairs of opposite sides equal (without proof).*
- *Both pairs of opposite angles equal.*
- *One pair of opposite sides equal and parallel (without proof).*
- *Diagonals bisect each other and bisect the parallelogram.*
- *Rhombus as a special parallelogram whose diagonals meet at right angles.*
- *In a rectangle, diagonals are equal, in a square they are equal and meet at right angles.*

(b) Constructions of Polygons

Construction of quadrilaterals (including parallelograms and rhombus) and regular hexagon using ruler and compasses only.

(c) Proof and use of Area theorems on parallelograms:

- *Parallelograms on the same base and between the same parallels are equal in area.*
- *The area of a triangle is half that of a parallelogram on the same base and between the same parallels.*
- *Triangles between the same base and between the same parallels are equal in area (without proof).*
- *Triangles with equal areas on the same bases have equal corresponding altitudes.*

(iii) Circle*:*

(a) Chord properties

- *A straight line drawn from the centre of a circle to bisect a chord which is not a diameter is at right angles to the chord.*

- *The perpendicular to a chord from the centre bisects the chord (without proof).*
- *Equal chords are equidistant from the centre.*
- *Chords equidistant from the centre are equal (without proof).*
- *There is one and only one circle that passes through three given points not in a straight line.*

(b) Arc and chord properties:

- *If two arcs subtend equal angles at the centre, they are equal, and its converse.*
- *If two chords are equal, they cut off equal arcs, and its converse (without proof).*

Note: Proofs of the theorems given above are to be taught unless specified otherwise.

5. Statistics

Introduction, collection of data, presentation of data, Graphical representation of data, Mean, Median of ungrouped data.

(i) Understanding and recognition of raw, arrayed and grouped data.

(ii) Tabulation of raw data using tally-marks.

(iii) Understanding and recognition of discrete and continuous variables.

(iv) Mean, median of ungrouped data.

(v) Class intervals, class boundaries and limits, frequency, frequency table, class size for grouped data.

(vi) Grouped frequency distributions: the need to and how to convert discontinuous intervals to continuous intervals.

(vii) Drawing a frequency polygon.

6. Mensuration

Area and perimeter of a triangle and a quadrilateral. Area and circumference of circle. Surface area and volume of Cube and Cuboids.

(a) Area and perimeter of triangle (including Heron's formula), all types of Quadrilaterals.

(b) Circle: Area and Circumference. Direct application problems including Inner and Outer area.

Areas of sectors of circles other than quarter-circle and semicircle are not included.

(c) Surface area and volume of 3-D solids: cube and cuboid including problems of type involving:

- *Different internal and external dimensions of the solid.*
- *Cost.*
- *Concept of volume being equal to area of cross-section* x *height.*
- *Open/closed cubes/cuboids.*

7. Trigonometry

(a) Trigonometric Ratios: sine, cosine, tangent of an angle and their reciprocals.

(b) Trigonometric ratios of standard angles - 0, 30, 45, 60, 90 degrees. Evaluation of an expression involving these ratios.

(c) Simple 2-D problems involving one right-angled triangle.

(d) Concept of trigonometric ratios of complementary angles and their direct application:

$\sin A = \cos (90 - A)$, $\cos A = \sin (90 - A)$

$\tan A = \cot (90 - A)$, $\cot A = \tan (90 - A)$

$\sec A = \operatorname{cosec} (90 - A)$, $\operatorname{cosec} A = \sec (90 - A)$

8. Coordinate Geometry

Cartesian System, plotting of points in the plane for given coordinates, solving simultaneous linear equations in 2 variables graphically and finding the distance between two points using distance formula.

(a) Dependent and independent variables.

(b) Ordered pairs, coordinates of points and plotting them in the Cartesian plane.

(c) Solution of Simultaneous Linear Equations graphically.

(d) Distance formula.

INTERNAL ASSESSMENT

A minimum of two assignments are to be done during the year as prescribed by the teacher.

Suggested Assignments

- Conduct a survey of a group of students and represent it graphically - height, weight, number of family members, pocket money, etc.
- Planning delivery routes for a postman/milkman.
- Running a tuck shop/canteen.
- Study ways of raising a loan to buy a car or house, e.g. bank loan or purchase a refrigerator or a television set through hire purchase.
- Cutting a circle into equal sections of a small central angle to find the area of a circle by using the formula $A = \pi r^2$.
- To use flat cutouts to form cube, cuboids and pyramids to obtain formulae for volume and total surface area.
- Draw a circle of radius r on a ½ cm graph paper, and then on a 2 mm graph paper. Estimate the area enclosed in each case by actually counting the squares. Now try out with circles of different radii. Establish the pattern, if any, between the two observed values and the theoretical value (area = πr^2). Any modifications?

CLASS X

*There will be **one** paper of **two and a half** hours duration carrying 80 marks and Internal Assessment of 20 marks.*

Certain questions may require the use of Mathematical tables (Logarithmic and Trigonometric tables).

1. Commercial Mathematics

(i) Goods and Services Tax (GST)

Computation of tax including problems involving discounts, list-price, profit, loss, basic/cost price including inverse cases. Candidates are also expected to find price paid by the consumer after paying State Goods and Service Tax (SGST) and Central Goods and Service Tax (CGST) - the different rates as in vogue on different types of items will be provided. Problems based on corresponding inverse cases are also included.

(ii) Banking

Recurring Deposit Accounts*: computation of interest and maturity value using the formula:*

$$I = P\frac{n(n+1)}{2\times 12}\times\frac{r}{100}$$

$$MV = P \times n + I$$

(iii) Shares and Dividends

(a) Face/Nominal Value, Market Value, Dividend, Rate of Dividend, Premium.

(b) Formulae

- *Income = number of shares × rate of dividend × FV.*
- *Return = (Income / Investment) × 100.*

Note:** Brokerage and fractional shares **not included.

2. Algebra

(i) Linear Inequations

Linear Inequations in one unknown for $x \in$ N, W, Z, R. Solving:

- *Algebraically and writing the solution in set notation form.*
- *Representation of solution on the number line.*

(ii) Quadratic Equations in one variable

(a) Nature of roots

- *Two distinct real roots if $b^2 - 4ac > 0$*
- *Two equal real roots if $b^2 - 4ac = 0$*
- *No real roots if $b^2 - 4ac < 0$*

(b) Solving Quadratic equations by:

- *Factorisation*
- *Using Formula.*

(c) Solving simple quadratic equation problems.

(iii) Ratio and Proportion

(a) Proportion, Continued proportion, mean proportion

(b) Componendo, dividendo, alternendo, invertendo properties and their combinations.

(c) Direct simple applications on proportions only.

(iv) Factorisation of polynomials:

(a) Factor Theorem.

(b) Remainder Theorem.

(c) Factorising a polynomial completely after obtaining one factor by factor theorem.

Note: f (x) not to exceed degree 3.

(v) Matrices

(a) Order of a matrix. Row and column matrices.

(b) Compatibility for addition and multiplication.

(c) Null and Identity matrices.

(d) Addition and subtraction of 2×2 matrices.

(e) Multiplication of a 2×2 matrix by

- *a non-zero rational number*
- *a matrix.*

(vi) Arithmetic and Geometric Progression

- *Finding their General term.*
- *Finding Sum of their first 'n' terms.*
- *Simple Applications.*

(vii) Co-ordinate Geometry

(a) Reflection

(i) Reflection of a point in a line:

x=0, y =0, x= a, y=a, the origin.

(ii) Reflection of a point in the origin.

(iii) Invariant points.

(b) Co-ordinates expressed as (x,y), Section formula, Midpoint formula, Concept of slope, equation of a line, Various forms of straight lines.

(i) Section and Mid-point formula (Internal section only, co-ordinates of the centroid of a triangle included).

(ii) Equation of a line:

- *Slope –intercept form $y = mx + c$*
- *Two- point form $(y-y_1) = m(x-x_1)$*
- *Geometric understanding of 'm' as slope/ gradient/ $\tan\theta$ where θ is the angle the line makes with the positive direction of the x axis.*
- *Geometric understanding of 'c' as the y-intercept/the ordinate of the point where the line intercepts the y axis/ the point on the line where x=0.*
- *Conditions for two lines to be parallel or perpendicular.*

Simple applications of all the above.

3. Geometry

(a) Similarity

Similarity, conditions of similar triangles.

(i) As a size transformation.

(ii) Comparison with congruency, keyword being proportionality.

(iii) Three conditions: SSS, SAS, AA. Simple applications (proof not included).

(iv) Applications of Basic Proportionality Theorem.

(v) Areas of similar triangles are proportional to the squares of corresponding sides.

(vi) Direct applications based on the above including applications to maps and models.

(b) Loci

Loci: Definition, meaning, Theorems and constructions based on Loci.

(i) *The locus of a point at a fixed distance from a fixed point is a circle with the fixed point as centre and fixed distance as radius.*

(ii) The locus of a point equidistant from two intersecting lines is the bisector of the angles between the lines.

(iii) The locus of a point equidistant from two given points is the perpendicular bisector of the line joining the points.

Proofs not required.

(c) Circles

(i) Angle Properties

- *The angle that an arc of a circle subtends at the centre is double that which it subtends at any point on the remaining part of the circle.*
- *Angles in the same segment of a circle are equal (without proof).*
- *Angle in a semi-circle is a right angle.*

(ii) Cyclic Properties:

- *Opposite angles of a cyclic quadrilateral are supplementary.*
- *The exterior angle of a cyclic quadrilateral is equal to the opposite interior angle (without proof).*

(iii) Tangent and Secant Properties:

- *The tangent at any point of a circle and the radius through the point are perpendicular to each other.*
- *If two circles touch, the point of contact lies on the straight line joining their centres.*
- *From any point outside a circle, two tangents can be drawn, and they are equal in length.*
- *If two chords intersect internally or externally then the product of the lengths of the segments are equal.*
- *If a chord and a tangent intersect externally, then the product of the lengths of segments of the chord is equal to the square of the length of the tangent from the point of contact to the point of intersection.*
- *If a line touches a circle and from the point of contact, a chord is drawn, the angles between the tangent and the chord are respectively equal to the angles in the corresponding alternate segments.*

Note: Proofs of the theorems given above are to be taught unless specified otherwise.

(iv) Constructions

(a) Construction of tangents to a circle from an external point.

(b) Circumscribing and inscribing a circle on a triangle and a regular hexagon.

4. Mensuration

Area and volume of solids – Cylinder, Cone and Sphere.

Three-dimensional solids - right circular cylinder, right circular cone and sphere: Area (total surface and curved surface) and Volume. Direct application problems including cost, Inner and Outer volume and melting and recasting method to find the volume or surface area of a new solid. Combination of solids included.

Note: Problems on Frustum are not included.

5. Trigonometry

(a) Using Identities to solve/prove simple algebraic trigonometric expressions

$\sin^2 A + \cos^2 A = 1$

$1 + \tan^2 A = \sec^2 A$

$1 + \cot^2 A = \operatorname{cosec}^2 A;\ 0 \le A \le 90°$

(b) *Heights and distances: Solving 2-D problems involving angles of elevation and depression using trigonometric tables.*

Note: Cases involving more than two right angled triangles excluded.

6. Statistics

Statistics – basic concepts, Mean, Median, Mode. Histograms and Ogive.

(a) Computation of:

- *Measures of Central Tendency: Mean, median, mode for raw and arrayed data. Mean*, median class and modal class for grouped data. (both continuous and discontinuous).*

** Mean by all 3 methods included:*

Direct : $\frac{\Sigma fx}{\Sigma f}$

Short-cut : $A + \frac{\Sigma fd}{\Sigma f}$ where $d = x - A$

Step-deviation: $A + \frac{\Sigma ft}{\Sigma f} \times i$ where $t = \frac{x - A}{i}$

(b) Graphical Representation. Histograms and Less than Ogive.

- *Finding the mode from the histogram, the upper quartile, lower Quartile and median etc. from the ogive.*
- *Calculation of inter Quartile range.*

7. Probability

Random experiments, Sample space, Events, definition of probability, Simple problems on single events.

SI UNITS, SIGNS, SYMBOLS AND ABBREVIATIONS

(1) Agreed conventions

(a) Units may be written in full or using the agreed symbols, but no other abbreviation may be used.

(b) The letter 's' is never added to symbols to indicate the plural form.

(c) A full stop is not written after symbols for units unless it occurs at the end of a sentence.

(d) When unit symbols are combined as a quotient, *e.g.,* metre per second, it is recommended that it should be written as m/s, or as m s^{-1}.

(e) Three decimal signs are in common international use: the full point, the mid-point and the comma. Since the full point is sometimes used for multiplication and the comma for spacing digits in large numbers, it is recommended that the mid-point be used for decimals.

(2) Names and symbols

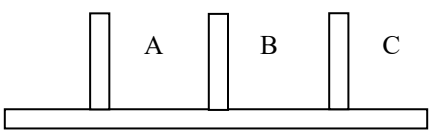
In general			
Implies that	$\Rightarrow$	is logically equivalent to	$\Leftrightarrow$
Identically equal to	$\equiv$	is approximately equal to	>>
In set language			
Belongs to	$\in$	does not belong to	$\notin$
is equivalent to	$\leftrightarrow$	is not equivalent to	$\not\leftrightarrow$
union	$\cup$	intersection	$\cap$
universal set	ξ	is contained in	$\subset$
natural (counting) numbers	N	the empty set	ø
integers	Z	whole numbers	W
		real numbers	R
In measures			
Kilometre	km	Metre	m
Centimetre	cm	Millimetre	mm
Kilogram	kg	Gram	g
Litre	L	Centilitre	cL
square kilometre	km^2	Square meter	m^2
square centimetre	cm^2	Hectare	ha
cubic metre	m^3	Cubic centimetre	cm^3
kilometres per hour	km/h	Metres per second	m/s

INTERNAL ASSESSMENT

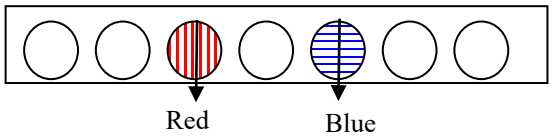
The minimum number of assignments: Two assignments as prescribed by the teacher.

Suggested Assignments

- Comparative newspaper coverage of different items.
- Survey of various types of Bank accounts, rates of interest offered.
- Planning a home budget.
- Conduct a survey in your locality to study the mode of conveyance / Price of various essential commodities / favourite sports. Represent the data using a bar graph / histogram and estimate the mode.
- To use a newspaper to study and report on shares and dividends.
- Set up a dropper with ink in it vertical at a height say 20 cm above a horizontally placed sheet of plain paper. Release one ink drop; observe the pattern, if any, on the paper. Vary the vertical distance and repeat. Discover any pattern of relationship between the vertical height and the ink drop observed.
- You are provided (or you construct a model as shown) - three vertical sticks (size of a pencil) stuck to a horizontal board. You should also have discs of varying sizes with holes (like a doughnut). Start with one disc; place it on (in) stick A. Transfer it to another stick (B or C); this is one move (m). Now try with two discs placed in A such that the large disc is below, and the smaller disc is above (number of discs = n=2 now). Now transfer them one at a time in B or C to obtain similar situation (larger disc below). How many moves? Try with more discs (n = 1, 2, 3, etc.) and generalise.



- The board has some holes to hold marbles, red on one side and blue on the other. Start with one pair. Interchange the positions by making one move at a time. A marble can jump over another to fill the hole behind. The move (m) equal 3. Try with 2 (n=2) and more. Find the relationship between n and m.



- Take a square sheet of paper of side 10 cm. Four small squares are to be cut from the corners of the square sheet and then the paper folded at the cuts to form an open box. What should be the size of the squares cut so that the volume of the open box is maximum?
- Take an open box, four sets of marbles (ensuring that marbles in each set are of the same size) and some water. By placing the marbles and water in the box, attempt to answer the question: do larger marbles or smaller marbles occupy more volume in a given space?
- An eccentric artist says that the best paintings have the same area as their perimeter (numerically). Let us not argue whether such sizes increase the viewer's appreciation, but only try and find what sides (in integers only) a rectangle must have if its area and perimeter are to be equal (Note: there are only two such rectangles).
- Find by construction the centre of a circle, using only a 60-30 setsquare and a pencil.
- Various types of "cryptarithm".

EVALUATION

The assignments/project work are to be evaluated by the subject teacher and by an External Examiner. (The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the section/class**. For example, a teacher of Mathematics of Class VIII may be deputed to be an External Examiner for Class X, Mathematics projects.)

The Internal Examiner and the External Examiner will assess the assignments independently.

Award of Marks	**(20 Marks)**
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on CISCE's CAREERS portal by the due date.

INTERNAL ASSESSMENT IN MATHEMATICS - GUIDELINES FOR MARKING WITH GRADES

Criteria	Preparation	Concepts	Computation	Presentation	Understanding	Marks
Grade I	Exhibits and selects a well-defined problem. Appropriate use of techniques.	Admirable use of mathematical concepts and methods and exhibits competency in using extensive range of mathematical techniques.	Careful and accurate work with appropriate computation, construction and measurement with correct units.	Presents well stated conclusions; uses effective mathematical language, symbols, conventions, tables, diagrams, graphs, etc.	Shows strong personal contribution; demonstrate knowledge and understanding of assignment and can apply the same in different situations.	4 marks for each criterion
Grade II	Exhibits and selects routine approach. Fairly good techniques.	Appropriate use of mathematical concepts and methods and shows adequate competency in using limited range of techniques.	Commits negligible errors in computation, construction and measurement.	Some statements of conclusions; uses appropriate math language, symbols, conventions, tables, diagrams, graphs, etc.	Neat with average amount of help; assignment shows learning of mathematics with a limited ability to use it.	3 marks for each criterion
Grade III	Exhibits and selects trivial problems. Satisfactory techniques.	Uses appropriate mathematical concepts and shows competency in using limited range of techniques.	Commits a few errors in computation, construction and measurement.	Assignment is presentable though it is disorganized in some places.	Lack of ability to conclude without help; shows some learning of mathematics with a limited ability to use it.	2 marks for each criterion
Grade IV	Exhibits and selects an insignificant problem. Uses some unsuitable techniques.	Uses inappropriate mathematical concepts for the assignment.	Commits many mistakes in computation, construction and measurement.	Presentation made is somewhat disorganized and untidy.	Lack of ability to conclude even with considerable help; assignment contributes to mathematical learning to a certain extent.	1 mark for each criterion
Grade V	Exhibits and selects a completely irrelevant problem. Uses unsuitable techniques.	Not able to use mathematical concepts.	Inaccurate computation, construction and measurement.	Presentation made is completely disorganized, untidy and poor.	Assignment does not contribute to mathematical learning and lacks practical applicability.	0 mark

SCIENCE (52)

PHYSICS

SCIENCE Paper - 1

Aims:

1. To acquire knowledge and understanding of the terms, facts, concepts, definitions, laws, principles and processes of Physics.
2. To develop skills in practical aspects of handling apparatus, recording observations and in drawing diagrams, graphs, etc.
3. To develop instrumental, communication, deductive and problem-solving skills.
4. To discover that there is a living and growing physics relevant to the modern age in which we live.

CLASS IX

*There will be one paper of **two hours** duration carrying 80 marks and Internal Assessment of practical work carrying 20 marks.*

***Note:** Unless otherwise specified, only SI Units are to be used while teaching and learning, as well as for answering questions.*

1. Measurements and Experimentation

(i) International System of Units, **the required SI units with correct symbols are given at the end of this syllabus.** Other commonly used system of units - fps and cgs.

(ii) Measurements using common instruments, Vernier callipers and *micro-metre* screw gauge for length, and simple pendulum for time.

*Measurement of length using, Vernier callipers and micro-metre screw gauge. Decreasing least-count leads to an increase in accuracy; least-count (LC) of Vernier callipers and screw gauge), zero error (basic idea), (**no** numerical problems on callipers and screw gauge), simple pendulum; time period, frequency, graph of length l versus T^2 only; slope of the graph. Formula $T=2.\pi.\sqrt{l/g}$ [**no** derivation]. Only simple numerical problems.*

2. Motion in One Dimension

Scalar and vector quantities, distance, speed, velocity, acceleration; graphs of distance-time and speed-time; equations of uniformly accelerated motion with derivations.

Examples of Scalar and vector quantities only, rest and motion in one dimension; distance and displacement; speed and velocity; acceleration and retardation; distance-time and velocity-time graphs; meaning of slope of the graphs; [Non-uniform acceleration excluded].

Equations to be derived: $v = u + at$;

*$S = ut + \frac{1}{2}at^2$; $S = \frac{1}{2}(u+v)t$; $v^2 = u^2 + 2aS$. [Equation for S_n^{th} is **not** included].*

Simple numerical problems.

3. Laws of Motion

(i) Contact and non-contact forces; cgs & SI units.

Examples of contact forces (frictional force, normal reaction force, tension force as applied through strings and force exerted during collision) and non-contact forces (gravitational, electric and magnetic). General properties of non-contact forces. cgs and SI units of force and their relation with Gravitational units.

(ii) Newton's First Law of Motion (qualitative discussion) introduction of the idea of inertia, mass and force.

*Newton's first law; statement and qualitative discussion; definitions of inertia and force from first law, examples of inertia as illustration of first law. (Inertial mass **not** included).*

(iii)Newton's Second Law of Motion (including **F**=ma); weight and mass.

Detailed study of the second law. Linear momentum, p = mv; change in momentum Δp

= Δ(mv) = mΔv for mass remaining constant, rate of change of momentum;

Δ p/Δ t = mΔv /Δt = ma or

$$\{\frac{p_2 - p_1}{t} = \frac{mv - mu}{t} = \frac{m(v - u)}{t} = ma\};$$

Simple numerical problems combining

F = Δp /Δt = ma and equations of motion. Units of force - only cgs and SI.

(iv) Newton's Third Law of Motion (qualitative discussion only); simple examples.

Statement with qualitative discussion; examples of action - reaction pairs, (F_{BA} and F_{AB}); action and reaction always act on different bodies.

(v) Gravitation

Universal Law of Gravitation. (Statement and equation) and its importance. Gravity, acceleration due to gravity, free fall. Weight and mass, Weight as force of gravity comparison of mass and weight; gravitational units of force, (*Simple numerical problems), (problems on variation of gravity excluded*)

4. Fluids

(i) Change of pressure with depth (including the formula p=hρg); Transmission of pressure in liquids; atmospheric pressure.

Thrust and Pressure and their units; pressure exerted by a liquid column p = hρg; simple daily life examples, (i) broadness of the base of a dam, (ii) Diver's suit etc. some consequences of p = hρg; transmission of pressure in liquids; Pascal's law; examples; atmospheric pressure; common manifestation and consequences. Variations of pressure with altitude, (qualitative only); applications such as weather forecasting and altimeter. (Simple numerical problems)

(ii) Buoyancy, Archimedes' Principle;-floatation; relationship with density; relative density; determination of relative density of a solid.

Buoyancy, upthrust (F_B); definition; different cases, F_B>, = or < weight W of the body immersed; characteristic properties of upthrust; Archimedes' principle; explanation of cases where bodies with density ρ >, = or < the density ρ' of the fluid in which it is immersed.

Relative Density (RD) and Archimedes' principle. Experimental determination of RD of a solid and liquid denser than water. Floatation: principle of floatation; relation between the density of a floating body, density of the liquid in which it is floating and the fraction of volume of the body immersed; ($\rho_1/\rho_2 = V_2/V_1$); apparent weight of floating object; application to ship, submarine, iceberg, balloons, etc.

Simple numerical problems involving Archimedes' principle, buoyancy and floatation.

5. Heat and Energy

(i) Concepts of heat and temperature.

Heat as energy, SI unit – joule,

1 cal = 4.186 J exactly.

(ii) *Anomalous expansion of water; graphs showing variation of volume and density of water with temperature in the 0 to 10 ^{0}C range. Hope's experiment and consequences of Anomalous expansion.*

(iii) Energy flow and its importance:

Understanding the flow of energy as Linear and linking it with the laws of Thermodynamics- 'Energy is neither created nor destroyed' and 'No Energy transfer is 100% efficient.

(iv) Energy sources.

Solar, wind, water and nuclear energy (only qualitative discussion of steps to produce electricity). Renewable versus non-renewable sources (elementary ideas with example).

Renewable energy: biogas, solar energy, wind energy, energy from falling of water, run-of-the river schemes, energy from waste, tidal energy, etc. Issues of economic viability and ability to meet demands.

Non-renewable energy – coal, oil, natural gas. Inequitable use of energy in urban and rural areas. Use of hydro electrical powers for light and tube wells.

(v) Global warming and Green House effect:

Meaning, causes and impact on the life on earth. Projections for the future; what needs to be done.

Energy degradation – meaning and examples.

6. Light

(i) Reflection of light; images formed by a pair of parallel and perpendicular plane mirrors;

Laws of reflection; experimental verification; characteristics of images formed in a pair of mirrors, (a) parallel and (b) perpendicular to each other; uses of plane mirrors.

(ii) Spherical mirrors; characteristics of image formed by these mirrors. Uses of concave and convex mirrors. (Only simple direct ray diagrams are required).

Brief introduction to spherical mirrors - concave and convex mirrors, centre and radius of curvature, pole and principal axis, focus and focal length; location of images from ray diagram for various positions of a small linear object on the principal axis of concave and convex mirrors; characteristics of images.

f = R/2 (without proof); sign convention and direct numerical problems using the mirror formulae are included. (Derivation of formulae not required)

Uses of spherical mirrors.

Scale drawing or graphical representation of ray diagrams not required.

7. Sound

(i) Nature of Sound waves. Requirement of a medium for sound waves to travel; propagation and speed in different media; comparison with speed of light.

Sound propagation, terms – frequency (f), wavelength (λ), velocity (V), relation V = fλ. (Simple numerical problems) effect of different factors on the speed of sound; comparison of speed of sound with speed of light; consequences of the large difference in these speeds in air; thunder and lightning.

(ii) Infrasonic, sonic, ultrasonic f*requencies* and their applications.

Elementary ideas and simple applications only. Difference between ultrasonic and supersonic.

8. Electricity and Magnetism

(i) Simple electric circuit using an electric cell and a bulb to introduce the idea of current (including its relationship to charge); potential difference; insulators and conductors; closed and open circuits; direction of current (electron flow and conventional)

Current Electricity: brief introduction of sources of direct current - cells, accumulators (construction, working and equations excluded); Electric current as the rate of flow of electric charge (direction of current - conventional and electronic), symbols used in circuit diagrams. Detection of current by Galvanometer or ammeter (functioning of the meters not to be introduced). Idea of electric circuit by using cell, key, resistance wire/resistance box/rheostat, qualitatively.; elementary idea about work done in transferring charge through a conductor wire; potential difference V = W/q.

(No derivation of formula) simple numerical problems.

Social initiatives: Improving efficiency of existing technologies and introducing new eco-friendly technologies. Creating awareness and building trends of sensitive use of resources and products, e.g. reduced use of electricity.

(ii) Induced magnetism, Magnetic field of earth. Neutral points in magnetic fields.

Magnetism: magnetism induced by bar magnets on magnetic materials; induction precedes attraction; lines of magnetic field and their properties; evidences of existence of earth's magnetic field, magnetic compass. Uniform magnetic field of earth and non-uniform field of a bar magnet placed along magnetic north-south; neutral point; properties of magnetic field lines.

(iii) Introduction of electromagnet and its uses.

Self-explanatory.

INTERNAL ASSESSMENT OF PRACTICAL WORK

Candidates will be asked to carry out experiments for which instructions are given. The experiments may be based on topics that are not included in the syllabus but theoretical knowledge will not be required. A candidate will be expected to be able to follow simple instructions, to take suitable readings and to present these readings in a systematic form. He/she may be required to exhibit his/her data graphically. Candidates will be expected to appreciate and use the concepts of least count, significant figures and elementary error handling.

A set of 6 to 10 experiments may be designed as given below or as found most suitable by the teacher. Students should be encouraged to record their observations systematically in a neat tabular form - in columns with column heads including units or in numbered rows as necessary. The final result or conclusion may be recorded for each experiment. Some of the experiments may be demonstrated (with the help of students) if these cannot be given to each student as lab experiments.

1. Determine the least count of the Vernier callipers and measure the length and diameter of a small cylinder (average of three sets) - may be a metal rod of length 2 to 3 cm and diameter 1 to 2 cm.
2. Determine the pitch and least count of the given screw gauge and measure the mean radius of the given wire, taking three sets of readings in perpendicular directions.
3. Measure the length, breadth and thickness of a glass block using a metre rule (each reading correct to a mm), taking the mean of three readings in each case. Calculate the volume of the block in cm^3 and m^3. Determine the mass (not weight) of the block using any convenient balance in g and kg. Calculate the density of glass in cgs and SI units using mass and volume in the respective units. Obtain the relation between the two density units.
4. Measure the volume of a metal bob (the one used in simple pendulum experiments) from the readings of water level in a measuring cylinder using displacement method. Also calculate the same volume from the radius measured using Vernier callipers. Comment on the accuracies.
5. Obtain five sets of readings of the time taken for 20 oscillations of a simple pendulum of lengths about 70, 80, 90, 100 and 110 cm; calculate the time periods (T) and their squares (T^2) for each length (l). Plot a graph of l vs. T^2. Draw the best - fit straight - line graph. Also, obtain its slope. Calculate the value of g in the laboratory. It is $4\pi^2$ x slope.
6. Take a beaker of water. Place it on the wire gauze on a tripod stand. Suspend two thermometers - one with Celsius and the other with Fahrenheit scale. Record the thermometer readings at 5 to 7 different temperatures. You may start with ice-cold water, then allow it to warm up and then heat it slowly taking temperature (at regular intervals) as high as possible. Plot a graph of T_F vs. T_C. Obtain the slope. Compare with the theoretical value. Read the intercept on T_F axis for $T_C = 0$.
7. Using a plane mirror strip mounted vertically on a board, obtain the reflected rays for three rays incident at different angles. Measure the angles of incidence and angles of reflection. See if these angles are equal.
8. Place three object pins at different distances on a line perpendicular to a plane mirror fixed vertically on a board. Obtain two reflected rays (for each pin) fixing two pins in line with the image. Obtain the positions of the images in each case by extending backwards (using dashed lines), the lines representing reflected rays. Measure the object distances and image distances in the three cases. Tabulate. Are they equal? Generalize the result.
9. Obtain the focal length of a concave mirror (a) by distant object method, focusing its real image on a screen or wall and (b) by one needle method removing parallax or focusing the image of the illuminated wire gauze attached to a ray box. One could also improvise with a candle and a screen. Enter your observations in numbered rows.
10. Connect a suitable dc source (two dry cells or an acid cell), a key and a bulb (may be a small one used in torches) in series. Close the circuit by inserting the plug in the key. Observe the bulb as it lights up. Now open the circuit, connect another identical bulb in between the first bulb and the cell so that the two bulbs are in series. Close the key. Observe the lighted bulbs. How does the light from any one bulb compare with that in the first

case when you had only one bulb? Disconnect the second bulb. Reconnect the circuit as in the first experiment. Now connect the second bulb across the first bulb. The two bulbs are connected in parallel. Observe the brightness of any one bulb. Compare with previous results. Draw your own conclusions regarding the current and resistance in the three cases.

11. Plot the magnetic field lines of earth (without any magnet nearby) using a small compass needle. On another sheet of paper, place a bar magnet with its axis parallel to the magnetic lines of the earth, i.e. along the magnetic meridian or magnetic north south. Plot the magnetic field in the region around the magnet. Identify the regions where the combined magnetic field of the magnet and the earth is (a) strongest, (b) very weak but not zero, and (c) zero. Why is neutral point, so called?
12. Using a spring balance obtain the weight (in N) of a metal ball in air and then completely immersed in water in a measuring cylinder. Note the volume of the ball from the volume of the water displaced. Calculate the upthrust from the first two weights. Also calculate the mass and then weight of the water displaced by the bob $M=V.\rho$, $W=mg$). Use the above result to verify Archimedes principle.

CLASS X

*There will be one paper of **two hours** duration carrying 80 marks and Internal Assessment of practical work carrying 20 marks.*

***Note:** Unless otherwise specified, only SI Units are to be used while teaching and learning, as well as for answering questions.*

1. Force, Work, Power and Energy

(i) Turning forces concept; moment of a force; forces in equilibrium; centre of gravity; [discussions using simple examples and simple numerical problems].

Elementary introduction of translational and rotational motions; moment (turning effect) of a force, also called torque and its cgs and SI units; common examples - door, steering wheel, bicycle pedal, etc.; clockwise and anti-clockwise moments; conditions for a body to be in equilibrium (translational and rotational); principle of moment and its verification using a metre rule suspended by two spring balances with slotted weights hanging from it; simple numerical problems; Centre of gravity (qualitative only) with examples of some regular bodies and irregular lamina.

(ii) Uniform circular motion.

As an example of constant speed, though acceleration (force) is present. Differences between centrifugal and centripetal force.

(iii) Work, energy, power and their relation with force.

Definition of work. $W = FS\cos\theta$; special cases of $\theta = 0^0, 90^0$. W= mgh. Definition of energy, energy as work done. Various units of work and energy and their relation with SI units. [erg, calorie, kW h and eV]. Definition of Power, P=W/t; SI and cgs units; other units, kilowatt (kW), megawatt (MW) and gigawatt (GW); and horsepower (1hp=746W) [Simple numerical problems on work, power and energy].

(iv) Different types of energy (*e.g.,* chemical energy, Mechanical energy, heat energy, electrical energy, nuclear energy, sound energy, light energy).

Mechanical energy: potential energy U = mgh (derivation included) gravitational PE, examples; kinetic energy $K = \frac{1}{2} mv^2$ (derivation included); forms of kinetic energy: translational, rotational and vibrational - only simple examples. [Numerical problems on K and U only in case of translational motion]; qualitative discussions of electrical, chemical, heat, nuclear, light and sound energy, conversion from one form to another; common examples.

(v) Machines as force multipliers; load, effort, mechanical advantage, velocity ratio and efficiency; simple treatment of levers, pulley systems showing the utility of each type of machine.

Functions and uses of simple machines: Terms- effort E, load L, mechanical advantage MA = L/E, velocity ratio $VR = V_E/V_L = d_E/d_L$, input (W_i), output (W_o), efficiency (η), relation between η and MA, VR (derivation included); for all practical machines $\eta < 1$; MA < VR.

Lever: principle. First, second and third class of levers; examples: MA and VR in each case. Examples of each of these classes of levers as also found in the human body.

Pulley system: single fixed, single movable, block and tackle; MA, VR and η in each case.

(vi) Principle of Conservation of energy.

Statement of the principle of conservation of energy; theoretical verification that U + K = constant for a freely falling body. Application of this law to simple pendulum (qualitative only); [simple numerical problems].

2. Light

(i) Refraction of light through a glass block and a triangular prism - qualitative treatment of simple applications such as real and apparent depth of objects in water and apparent bending of sticks in water. Applications of refraction of light.

Partial reflection and refraction due to change in medium. Laws of refraction; the effect on speed (V), wavelength (λ) and frequency (f) due to refraction of light; conditions for a light ray to pass undeviated. Values of speed of light (c) in vacuum, air, water and glass; refractive index μ = c/V, V = fλ. Values of μ for common substances such as water, glass and diamond; experimental verification; refraction through glass block; lateral displacement; multiple images in thick glass plate/mirror; refraction through a glass prism, simple applications: real and apparent depth of objects in water; apparent bending of a stick under water. (Simple numerical problems and approximate ray diagrams required).

(ii) Total internal reflection: Critical angle; examples in triangular glass prisms; comparison with reflection from a plane mirror (qualitative only). Applications of total internal reflection.

Transmission of light from a denser medium (glass/water) to a rarer medium (air) at different angles of incidence; critical angle (C) μ = 1/sin C. Essential conditions for total internal reflection. Total internal reflection in a triangular glass prism; ray diagram, different cases - angles of prism (60°,60°,60°), (60°,30°,90°), (45°,45°,90°); use of right angle prism to obtain δ = 90° and 180° (ray diagram); comparison of total internal reflection from a prism and reflection from a plane mirror.

(iii) Lenses (converging and diverging) including characteristics of the images formed (using ray diagrams only); magnifying glass; location of images using ray diagrams and thereby determining magnification.

Types of lenses (converging and diverging), convex and concave, action of a lens as a set of prisms; technical terms; centre of curvature, radii of curvature, principal axis, foci, focal plane and focal length; detailed study of refraction of light in spherical lenses through ray diagrams; formation of images - principal rays or construction rays; location of images from ray diagram for various positions of a small linear object on the principal axis; characteristics of images. Sign convention and direct numerical problems using the lens formula are included (derivation of formula not required).

Scale drawing or graphical representation of ray diagrams not required.

*Power of a lens (concave and convex) – [simple direct numerical problems]: magnifying glass or simple microscope: location of image and magnification from ray diagram only [formula and numerical problems **not** included]. Applications of lenses.*

(iv) Using a triangular prism to produce a visible spectrum from white light; Electromagnetic spectrum. Scattering of light.

Deviation produced by a triangular prism; dependence on colour (wavelength) of light; dispersion and spectrum; electromagnetic spectrum: broad classification (names only arranged in order of increasing wavelength); properties common to all electromagnetic radiations; properties and uses of infrared and ultraviolet radiation. Simple application of scattering of light e.g. blue colour of the sky.

3. Sound

(i) Reflection of Sound Waves; echoes: their use; simple numerical problems on echoes.

Production of echoes, condition for formation of echoes; simple numerical problems; use of echoes by bats, dolphins, fishermen, medical field. SONAR.

(ii) Natural vibrations, Damped vibrations, Forced vibrations and Resonance - a special case of forced vibrations.

Meaning and simple applications of natural, damped, forced vibrations and resonance.

(iii) Loudness, pitch and quality of sound:

Characteristics of sound: loudness and intensity; subjective and objective nature of these properties; sound level in decibel(dB) (as unit only); noise pollution; interdependence of: pitch and frequency; quality and waveforms (with examples).

4. Electricity and Magnetism

(i) Ohm's Law; concepts of emf, potential difference, resistance; resistances in series and parallel, internal resistance.

Concepts of pd (V), current (I), resistance (R) and charge (Q). Ohm's law: statement, V=IR; SI units; experimental verification; graph of V vs I and resistance from slope; ohmic and non-ohmic resistors, factors affecting resistance (including specific resistance) and internal resistance; super conductors, electromotive force (emf); combination of resistances in series and parallel and derivation of expressions for equivalent resistance. Simple numerical problems using the above relations. [Simple network of resistors].

(ii) Electrical power and energy.

Electrical energy; examples of heater, motor, lamp, loudspeaker, etc. Electrical power; measurement of electrical energy, $W = QV = VIt$ from the definition of pd. Combining with ohm's law $W = VIt = I^2 Rt = (V^2/R)t$ and electrical power $P = (W/t) = VI = I^2R = V^2/R$. Units: SI and commercial; Power rating of common appliances, household consumption of electric energy; calculation of total energy consumed by electrical appliances; W = Pt (kilowatt × hour = kW h), [simple numerical problems].

(iii) Household circuits – main circuit; switches; fuses; earthing; safety precautions; three-pin plugs; colour coding of wires.

House wiring (ring system), power distribution; main circuit (3 wires-live, neutral, earth) with fuse / MCB, main switch and its advantages - circuit diagram; two-way switch, staircase wiring, need for earthing, fuse, 3-pin plug and socket; Conventional location of live, neutral and earth points in 3 pin plugs and sockets. Safety precautions, colour coding of wires.

(iv) Magnetic effect of a current (principles only, laws not required); electromagnetic induction (elementary); transformer.

Oersted's experiment on the magnetic effect of electric current; magnetic field (B) and field lines due to current in a straight wire (qualitative only), right hand thumb rule – magnetic field due to a current in a loop; Electromagnets: their uses; comparisons with a permanent magnet; Fleming's Left Hand Rule, the DC electric motor- simple sketch of main parts (coil, magnet, split ring commutators and brushes); brief description and type of energy transfer(working not required): Simple introduction to electromagnetic induction; frequency of AC in house hold supplies , Fleming's Right Hand Rule, AC Generator - Simple sketch of main parts, brief description and type of energy transfer(working not required). Advantage of AC over DC. Transformer- its types, characteristics of primary and secondary coils in each type (simple labelled diagram and its uses).

5. Heat

(i) Calorimetry: meaning, specific heat capacity; principle of method of mixtures; Numerical Problems on specific heat capacity using heat loss and gain and the method of mixtures.

Heat and its units (calorie, joule), temperature and its units (^oC, K); thermal (heat) capacity $C' = Q/\Delta T$... (SI unit of C'): Specific heat Capacity $C = Q/m\Delta T$ (SI unit of C) Mutual relation between Heat Capacity and Specific Heat capacity, values of C for some common substances (ice, water and copper). Principle of method of mixtures including mathematical statement. Natural phenomenon involving specific heat. Consequences of high specific heat of water. [Simple numerical problems].

(ii) Latent heat; loss and gain of heat involving change of state for fusion only.

Change of phase (state); heating curve for water; latent heat; specific latent heat of fusion (SI unit). Simple numerical problems. Common physical phenomena involving latent heat of fusion.

6. Modern Physics

(i) Radioactivity and changes in the nucleus; background radiation and safety precautions.

Brief introduction (qualitative only) of the nucleus, nuclear structure, atomic number (Z), mass number (A). Radioactivity as spontaneous disintegration. α, β and γ - their nature and properties; changes within the nucleus. One example each of α and β decay with equations showing changes in Z and A. Uses of radioactivity - radio isotopes. Harmful effects. Safety precautions. Background radiation.

Radiation: X-rays; radioactive fallout from nuclear plants and other sources.

Nuclear Energy: working on safe disposal of waste. Safety measures to be strictly reinforced.

(ii) Nuclear fission and fusion; basic introduction and equations.

A NOTE ON SI UNITS

SI units (*Systeme International d'Unites*) were adopted internationally in 1968.

Fundamental units

The system has seven fundamental (or basic) units, one for each of the fundamental quantities.

Fundamental quantity	Unit	
	Name	Symbol
Mass	kilogram	kg
Length	metre	m
Time	second	s
Electric current	ampere	A
Temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Derived units

These are obtained from the fundamental units by multiplication or division; no numerical factors are involved. Some derived units with complex names are:

Derived quantity	Unit	
	Name	Symbol
Volume	cubic metre	m^3
Density	kilogram per cubic metre	kg m^{-3}
Velocity	metre per second	m s^{-1}
Acceleration	metre per second square	m s^{-2}
Momentum	kilogram metre per second	kg m s^{-1}

Some derived units are given special names due to their complexity when expressed in terms of the fundamental units, as below:

Derived quantity	Unit	
	Name	Symbol
Force	newton	N
Pressure	pascal	Pa
Energy, Work	joule	J
Power	watt	W
Frequency	hertz	Hz
Electric charge	coulomb	C
Electric resistance	ohm	Ω
Electromotive force	volt	V

When the unit is named after a person, the *symbol* has a capital letter.

Standard prefixes

Decimal multiples and submultiples are attached to units when appropriate, as below:

Multiple	Prefix	Symbol
10^9	giga	G
10^6	mega	M
10^3	kilo	k
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f

INTERNAL ASSESSMENT OF PRACTICAL WORK

Candidates will be asked to carry out experiments for which instructions will be given. The experiments may be based on topics that are not included in the syllabus but theoretical knowledge will not be required. A candidate will be expected to be able to follow simple instructions, to take suitable readings and to present these readings in a systematic form. He/she may be required to exhibit his/her data graphically. Candidates will be expected to appreciate and use the concepts of least count, significant figures and elementary error handling.

Note: Teachers may design their own set of experiments, preferably related to the theory syllabus. A comprehensive list is suggested below:

1. Lever - There are many possibilities with a meter rule as a lever with a load (known or unknown) suspended from a point near one end (say left), the lever itself pivoted on a knife edge, use slotted weights suspended from the other (right) side for effort.

   Determine the mass of a metre rule using a spring balance or by balancing it on a knife edge at some point away from the middle and a 50g weight on the other side. Next pivot (F) the metre rule at the 40cm, 50cm and 60cm mark, each time suspending a load L or the left end and effort E near the right end. Adjust E and or its position so that the rule is balanced. Tabulate the position of L, F and E and the magnitudes of L and E and the distances of load arm and effort arm. Calculate MA=L/E and VR = effort arm/load arm. It will be found that MA <VR in one case, MA=VR in another and MA>VR in the third case. Try to explain why this is so. Also try to calculate the real load and real effort in these cases.

2. Determine the VR and MA of a given pulley system.

3. Trace the course of different rays of light refracting through a rectangular glass slab at different angles of incidence, measure the angles of incidence, refraction and emergence. Also measure the lateral displacement.

4. Determine the focal length of a convex lens by (a) the distant object method and (b) using a needle and a plane mirror.

5. Determine the focal length of a convex lens by using two pins and formula $f = uv/(u+v)$.

6. For a triangular prism, trace the course of rays passing through it, measure angles i_1, i_2, A and δ.Repeat for four different angles of incidence (say $i_1=40^0$, 50^0, 60^0 and 70^0). Verify $i_1+ i_2=A+\delta$ and $A = r_1 + r_2$.

7. For a ray of light incident normally ($i_1=0$) on one face of a prism, trace course of the ray. Measure the angle δ. Explain briefly. Do this for prisms with $A=60^0$, 45^0 and 90^0.

8. Calculate the specific heat capacity of the material of the given calorimeter, from the temperature readings and masses of cold water, warm water and its mixture taken in the calorimeter.

9. Determination of specific heat capacity of a metal by method of mixtures.

10. Determination of specific latent heat of ice.

11. Using as simple electric circuit, verify Ohm's law. Draw a graph, and obtain the slope.

12. Set up model of household wiring including ring main circuit. Study the function of switches and fuses.

Teachers may feel free to alter or add to the above list. The students may perform about ten experiments. Some experiments may be demonstrated.

EVALUATION

The practical work/project work are to be evaluated by the subject teacher and by an External Examiner. (The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the relevant section/class**. For example, a teacher of Physics of Class VIII may be deputed to be an External Examiner for Class X, Physics projects.)

The Internal Examiner and the External Examiner will assess the practical work/project work independently.

Award of Marks	**(20 Marks)**
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on CISCE's CAREERS portal by the due date.

SCIENCE (52)

CHEMISTRY

SCIENCE Paper - 2

Aims:

1. To acquire the knowledge of terms, concepts, processes, techniques and principles related to the subject.
2. To develop the ability to apply the knowledge of contents and principles of chemistry in unfamiliar situations.
3. To acquire skills in proper handling of apparatus and chemicals.
4. To develop scientific temper, attitude and problem-solving skills.
5. To recognize Chemical Science as having an important impact on the environment relating to cycles in nature; natural resources, pollution.

CLASS IX

*There will be one paper of **two hours** duration of 80 marks and Internal Assessment of practical work carrying 20 marks.*

***Note:** All chemical processes/reactions should be studied with reference to the reactants, products, conditions, observations and the (balanced) equations and diagrams.*

1. The Language of Chemistry

(i) Symbol of an element; valency; formulae of radicals and formulae of compounds. Balancing of simple chemical equations.

- *Symbol – definition; symbols of the elements used often.*
- *Valency - definition; hydrogen combination and number of valence electrons of the metals and non-metals; mono, di, tri and tetra valent elements.*
- *Radicals – definition; formulae and valencies.*
- *Compounds – name and formulae.*
- *Chemical equation – definition and examples of chemical equations with one reactant and two or three products, two reactants and one product, two reactants and two products and two reactants and three or four products; balancing of equations. (by hit and trial method).*

(ii) Relative Atomic Masses (atomic weights) and Relative Molecular Masses (molecular weights): either - standard H atom or $1/12^{th}$ of carbon 12 atom.

- *Definitions*
- *Calculation of Relative Molecular Mass and percentage composition of a compound.*

2. Chemical changes and reactions

(i) Types of chemical changes.

- *Direct combination*
- *Decomposition*
- *Displacement;*
- *Double decomposition*

(The above to be taught with suitable chemical equations as examples).

(ii) Energy changes in a chemical change.

Exothermic and endothermic reactions with examples – evolution/absorption of heat, light and electricity.

3. Water

(i) Water as a universal solvent.

- *Solutions as 'mixtures' of solids in water; saturated solutions.*
- *Qualitative effect of temperature on solubility (e.g. solutions of calcium sulphate, potassium nitrate and sodium chloride in water).*

(ii) Hydrated and anhydrous substances.

(a) Hydrated substances:

Water of Crystallisation – meaning and examples.

(b*)* Anhydrous substances:

Meaning and examples only

(c) Properties*:*

- *Efflorescence*
- *Deliquescence*
- *Hygroscopy*
- *Removal of hardness*

(i) By boiling

(ii) By addition of washing soda

(Definition and examples of each of the above).

(iii) Drying and Dehydrating Agents

Meaning and examples only.

(iv) Soft water and Hard water

- *Meaning, (in terms of action of soap)*
- *Advantages and disadvantages of soft water and hard water.*
- *Types and causes of hardness.*

4. Atomic Structure and Chemical bonding

(i) Structure of an Atom, mass number and atomic number, Isotopes and Octet Rule.

- *Definition of an atom*
- *Constituents of an atom - nucleus (protons, neutrons) with associated electrons; mass number, atomic number.*
- *Electron distribution in the orbits - $2n^2$ rule, Octet rule. Reason for chemical activity of an atom.*
- *Definition and examples of isotopes (hydrogen, carbon, chlorine).*

(ii) Electrovalent and covalent bonding, structures of various compounds – orbit structure

(a) Electrovalent Bond

- *Definition*
- *Atomic orbit structure for the formation of Electrovalent compounds (e.g. NaCl, $MgCl_2$, CaO);*

(b) Covalent Bond

- *Definition*
- *Atomic orbit structure for the formation of Covalent molecules on the basis of duplet and octet of electrons (examples: hydrogen, chlorine, oxygen, nitrogen, hydrogen chloride, water, ammonia, carbon tetrachloride, methane.)*

5. The Periodic Table

Dobereiner's Triads, Newland's law of Octaves, Mendeleev's contributions; Modern Periodic Law, the Modern Periodic Table. (Groups and periods)

- *General idea of Dobereiner's triads, Newland's law of Octaves, Mendeleev's periodic law.*
- *Discovery of Atomic Number and its use as a basis for Modern Periodic law.*
- *Modern Periodic Table (Groups 1 to 18 and periods 1 to 7).*
- *Special reference to Alkali metals (Group 1), Alkaline Earth metals (Group 2) Halogens (Group 17) and Zero Group (Group 18).*

6. Study of the First Element -Hydrogen

Position of the non-metal (Hydrogen) in the periodic table and general group characteristics with reference to valency electrons, burning, ion formation applied to the above-mentioned element.

(i) Hydrogen from: water, dilute acids and alkalis.

(a) Hydrogen from water:

- *The action of cold water on sodium potassium and calcium.*

- *The action of hot water on magnesium.*
- *The action of steam on aluminium, zinc, and iron; (reversibility of reaction between iron and steam).*
- *The action of steam on non-metal (carbon).*

Students can be shown the action of sodium and calcium on water in the laboratory. They must be asked to make observations and write equations for the above reactions.

Application of activity series for the above-mentioned reactions.

(b) Displacement of hydrogen from dilute acids.

The action of dilute sulphuric acid or hydrochloric acid on metals: Mg, Al, Zn and Fe .

(To understand reasons for not using other metals and dilute nitric acid.)

(c) Displacement of hydrogen from alkalis.

The action of Alkalis ((NaOH, KOH) on Al, Zn and Pb – unique nature of these elements.

(ii) The preparation and collection of hydrogen by a standard laboratory method other than electrolysis.

In the laboratory preparation, the reason for using zinc, the impurities in the gas, their removal and the precautions in the collection of the gas must be mentioned.

(iii) Industrial manufacture of hydrogen by Bosch process.

- *Main reactions and conditions.*
- *Separation of CO_2 and CO from hydrogen.*

(iv) Oxidation and reduction reactions.

Differences in terms of addition and removal of oxygen / hydrogen.

7. Study of Gas Laws

(i) The behaviour of gases under changes of temperature and pressure; explanation in terms of molecular motion (particles, atoms, molecules); Boyle's Law and Charles' Law; absolute zero; gas equation; simple relevant calculations.

- *The behaviour of gases under changes of temperature and pressure; explanation in terms of molecular motion (particles, atoms, molecules).*
- *Boyle's Law: statement, mathematical form, simple calculations.*
- *Charles' Law: statement, mathematical form, simple calculations.*
- *Absolute zero Kelvin scale of temperature.*
- *Gas equation $P_1 V_1 / T_1 = P_2 V_2 / T_2$; simple relevant calculations based on gas equation.*

(ii) Relationship between Kelvin scale and Celsius Scale of temperature; Standard temperature and pressure.

Conversion of temperature from Celsius Scale to Kelvin scale and vice versa. Standard temperature and pressure. (Simple calculations).

8. Atmospheric pollution

(a) Acid rain – composition, cause and its impact.

Sulphur in fossil fuels giving oxides of sulphur when burnt. High temperatures in furnaces and internal combustion engines produce oxides of nitrogen. (Equations to be included). Acid rain affects soil chemistry and water bodies.

(b) Global warming:

Greenhouse gases – their sources and ways of reducing their presence in the atmosphere.

(Water vapour, carbon dioxide, methane and oxides of nitrogen)

(c) Ozone depletion

- *Formation of ozone – relevant equations*
- *Function in the atmosphere.*
- *Destruction of the ozone layer – chemicals responsible for this to be named but reactions not required.*

INTERNAL ASSESSMENT OF PRACTICAL WORK

Candidates will be asked to observe the effect of reagents and/or of heat on substances supplied to them. The exercises will be simple and may include the recognition and identification of certain gases listed below.

Gases: Hydrogen, Oxygen, Carbon dioxide, Chlorine, Hydrogen chloride, Sulphur dioxide, Hydrogen sulphide, Ammonia, Water vapour, Nitrogen dioxide.

Candidates are expected to have completed the following minimum practical work.

Simple experiments on:

1. Action of heat on the following compounds:
   (a) copper carbonate, zinc carbonate
   (b) washing soda, copper sulphate crystals
   (c) zinc nitrate, copper nitrate, lead nitrate
   (d) ammonium chloride, iodine, ammonium dichromate

   Make observations, identify the products and make deductions where possible.
2. Action of dilute sulphuric acid on the following substances. (warm if necessary)
   (a) a metal
   (b) a carbonate
   (c) a sulphide
   (d) a sulphite

   Make observations, identify the gas evolved and make deductions.
3. Apply the flame test to identify the metal in the unknown substance.
   (a) a sodium salt
   (b) a potassium salt
   (c) a calcium compound
4. Simple experiments based on hard water and soft water – identification of hardness – simple softening – by heating the temporary hard water, using washing soda and advantage of using detergents over soap in hard water.
5. Find out the sources of pollution of water bodies in the locality. Suggest preventive steps to control it.

CLASS X

*There will be one paper of **two hours** duration of 80 marks and Internal Assessment of practical work carrying 20 marks.*

***Note:** All chemical processes/reactions should be studied with reference to the reactants, products, conditions, observations and the (balanced) equations and diagrams.*

1. Periodic Properties and variations of Properties – Physical and Chemical

(i) Periodic properties and their variations in groups and periods.

Definitions and trends of the following periodic properties in groups and periods should be studied:

- *atomic size*
- *metallic character*
- *non-metallic character*
- *ionisation potential*
- *electron affinity*
- *electronegativity*

(ii) Periodicity on the basis of atomic number for elements.

- *The study of modern periodic table up to period 3 (students to be exposed to the complete modern periodic table but no questions will be asked on elements beyond period 3 – Argon);*
- *Periodicity and other related properties to be explained on the basis of nuclear charge and shells (not orbitals).*

(Special reference to the alkali metals and halogen groups).

2. Chemical Bonding

Electrovalent, covalent and co-ordinate bonding, structures of various compounds, Electron dot structure.

(a) Electrovalent bonding:

- *Electron dot structure of Electrovalent compounds NaCl, $MgCl_2$, CaO.*
- *Characteristic properties of electrovalent compounds – state of existence, melting and boiling points, conductivity (heat and electricity), dissociation in solution and in molten state to be linked with electrolysis.*

(b) Covalent Bonding:

- *Electron dot structure of covalent molecules on the basis of duplet and octet of electrons (example: hydrogen, chlorine, nitrogen, ammonia, carbon tetrachloride, methane.*
- *Polar Covalent compounds – based on difference in electronegativity*:

  Examples – HCl and H_2O including structures.
- *Characteristic properties of Covalent compounds – state of existence, melting and boiling points, conductivity (heat and electricity), ionisation in solution.*

  ***Comparison of Electrovalent and Covalent compounds**.*

(c) Coordinate Bonding:

- *Definition*
- *The lone pair effect of the oxygen atom of the water molecule and the nitrogen atom of the ammonia molecule to explain the formation of H_3O^+ and OH^- ions in water and NH_4^+ ion.*

The meaning of lone pair; the formation of hydronium ion and ammonium ion must be explained with the help of electron dot diagrams.

3. Study of Acids, Bases and Salts

(i) Simple definitions in terms of the molecules and their characteristic properties.

(ii) Ions present in mineral acids, alkalis and salts and their solutions; use of litmus and pH paper to test for acidity and alkalinity.

- *Examples with equation for the ionisation/dissociation of ions of acids, bases and salts.*
- *Acids form hydronium ions (only positive ions) which turn blue litmus red, alkalis form hydroxyl ions (only negative ions) with water which turns red litmus blue.*

- *Salts are formed by partial or complete replacement of the hydrogen ion of an acid by a metal. (To be explained with suitable examples).*
- *Introduction to pH scale to test for acidity, neutrality and alkalinity by using pH paper or Universal indicator.*

(iii) Definition of salt; types of salts.

Types of salts: normal salts, acid salt, basic salt, definition and examples.

(iv) Action of dilute acids on salts.

Decomposition of hydrogen carbonates, carbonates, sulphites and sulphides by appropriate acids with heating if necessary. (Relevant laboratory work must be done).

(v) Methods of preparation of Normal salts with **relevant equations**. (Details of apparatus or procedures not required).

Methods included are:

- *Direct combination*
- *Displacement*
- *Precipitation (double decomposition)*
- *Neutralization* of *insoluble base*
- *Neutralisation of an alkali (titration)*
- *Action of dilute acids on carbonates and bi-carbonates.*

4. Analytical Chemistry

(i) Action of Ammonium Hydroxide and Sodium Hydroxide on solution of salts: colour of salt and its solution; formation and colour of hydroxide precipitated for solutions of salts of Ca, Fe, Cu, Zn and Pb; special action of ammonium hydroxide on solutions of copper salt and sodium hydroxide on ammonium salts.

On solution of salts:

- *Colour of salt and its solution.*
- *Action on addition of Sodium Hydroxide to solution of Ca, Fe, Cu, Zn, and Pb salts drop by drop in excess. Formation and colour of hydroxide precipitated to be highlighted with the help of equations.*
- *Action on addition of Ammonium Hydroxide to solution of Ca, Fe, Cu, Zn, and Pb salts drop by drop in excess. Formation and colour of hydroxide precipitated to be highlighted with the help of equations.*
- *Special action of Ammonium Hydroxide on solutions of copper salts and sodium hydroxide on ammonium salts.*

(ii) Action of alkalis (*NaOH, KOH) on* certain metals, their oxides and hydroxides.

The metals must include aluminium, zinc and lead, their oxides and hydroxides, which react with caustic alkalis (NaOH, KOH), showing the amphoteric nature of these substances.

5. Mole Concept and Stoichiometry

(i) Gay Lussac's Law of Combining Volumes; Avogadro's Law.

- *Idea of mole – a number just as a dozen, a gross (Avogadro's number).*
- *Avogadro's Law - statement and explanation.*
- *Gay Lussac's Law of Combining Volumes. – Statement and explanation.*
- *Understanding molar volume- "the mass of 22.4 litres of any gas at S.T.P. is equal to its molar mass". (Questions will not be set on formal proof but may be taught for clear understanding).*
- *Simple calculations based on the molar volume and Gay Lussac's law.*

(ii) Refer to the atomicity of hydrogen, oxygen, nitrogen and chlorine (proof not required).

The explanation can be given using equations for the formation of HCl, NH_3, and NO.

(iii) Vapour Density and its relation to relative molecular mass:

- *Molecular mass = 2×vapour density (formal proof not required)*
- *Deduction of simple (empirical) and molecular formula from:*

(a) *the percentage composition of a compound.*

(b) *the masses of combining elements.*

(iv) Mole and its relation to mass.

- *Relating mole and atomic mass; arriving at gram atomic mass and then gram atom; atomic mass is a number dealing with one atom; gram atomic mass is the mass of one mole of atoms.*
- *Relating mole and molecular mass arriving at gram molecular mass and gram molecule – molecular mass is a number dealing with a molecule, gram molecular mass is the mass of one mole of molecules.*
- *Simple calculations based on relation of mole to mass, volume and Avogadro's number.*

(v) Simple calculations based on chemical equations

Related to weight and/or volumes of both reactants and products.

6. Electrolysis

(i) Electrolytes and non-electrolytes.

Definitions and examples.

(ii) Substances containing molecules only, ions only, both molecules and ions.

- *Substances containing molecules only ions only, both molecules and ions.*
- *Examples; relating their composition with their behaviour as* ***strong and weak electrolytes as well as non-electrolytes***.

(iii) Definition and explanation of electrolysis, electrolyte, electrode, anode, cathode, anion, cation, oxidation and reduction (on the basis of loss and gain of electrons).

(iv) An elementary study of the migration of ions, with reference to the factors influencing selective discharge of ions (reference should be made to the activity series as indicating the tendency of metals, e.g. Na, Mg, Fe, Cu, to form ions) illustrated by the electrolysis of:

- *Molten lead bromide*
- *acidified water with platinum electrodes*
- *Aqueous copper (II) sulphate with copper electrodes; electron transfer at the electrodes.*

The above electrolytic processes can be studied in terms of electrolyte used, electrodes used, ionization reaction, anode reaction, cathode reaction, use of selective discharge theory, wherever applicable.

(v) Applications of electrolysis.

- *Electroplating with nickel and silver, choice of electrolyte for electroplating.*
- *Electro refining of copper.*

Reasons and conditions for electroplating; names of the electrolytes and the electrodes used should be given. Equations for the reactions at the electrodes should be given for electroplating, refining of copper.

7. Metallurgy

(i) Occurrence of metals in nature:

- *Mineral and ore - Meaning only.*
- *Common ores of iron, aluminium and zinc.*

(ii) Stages involved in the extraction of metals.

(a) *Dressing of the ore – hydrolytic method, magnetic separation, froth flotation method.*

(b) *Conversion of concentrated ore to its oxide- roasting and calcination (definition, examples with equations).*

(c) *Reduction of metallic oxides- some can be reduced by hydrogen, carbon and carbon monoxide (e.g. copper oxide, lead (II) oxide, iron (III) oxide and zinc oxide) and some cannot (e.g. Al_2O_3, MgO) - refer to activity series). Active metals by electrolysis e.g. sodium, potassium and calcium. (reference only).*

Equations with conditions should be given.

(d) *Electro refining – reference only.*

(iii) Extraction of Aluminium.

(a) Chemical method for purifying bauxite by using NaOH – Baeyer's Process.

(b) Electrolytic extraction – Hall Heroult's process:

Structure of electrolytic cell - the various components as part of the electrolyte, electrodes and electrode reactions.

Description of the changes occurring, purpose of the substances used and the main reactions with their equations.

(iv) Alloys – composition and uses.

Stainless steel, duralumin, brass, bronze, fuse metal / solder.

8. Study of Compounds

A. Hydrogen Chloride

Hydrogen chloride: preparation of hydrogen chloride from sodium chloride; refer to the density and solubility of hydrogen chloride (fountain experiment); reaction with ammonia; acidic properties of its solution.

- *Preparation of hydrogen chloride from sodium chloride; the laboratory method of preparation can be learnt in terms of reactants, product, condition, equation, diagram or setting of the apparatus, procedure, observation, precaution, collection of the gas and identification.*
- *Simple experiment to show the density of the gas (Hydrogen Chloride) –heavier than air.*
- *Solubility of hydrogen chloride (fountain experiment); setting of the apparatus, procedure, observation, inference.*
- *Method of preparation of hydrochloric acid by dissolving the gas in water- the special arrangement and the mechanism by which the back suction is avoided should be le*arnt.
- *Reaction with ammonia*
- *Acidic properties of its solution - reaction with metals, their oxides, hydroxides and carbonates to give their chlorides; decomposition of carbonates, hydrogen carbonates, sulphides, sulphites.*
- *Precipitation reactions with silver nitrate solution and lead nitrate solution.*

B. Ammonia

Ammonia: its laboratory preparation from ammonium chloride and collection; ammonia from nitrides like Mg_3N_2 and AlN and ammonium salts. Manufacture by Haber's Process; density and solubility of ammonia (fountain experiment); aqueous solution of ammonia; its reactions with hydrogen chloride and with hot copper (II) oxide and chlorine; the burning of ammonia in oxygen; uses of ammonia.

- *Laboratory preparation from ammonium chloride and collection; (the preparation to be studied in terms of, setting of the apparatus and diagram, procedure, observation, collection and identification)*
- *Ammonia from nitrides like Mg_3N_2 and AlN using warm water.*

  Ammonia from ammonium salts using alkalies.

The reactions to be studied in terms of reactants, products, conditions and equations.

- *Manufacture by Haber's Process.*
- *Density and solubility of ammonia (fountain experiment).*
- *The burning of ammonia in oxygen.*
- *The catalytic oxidation of ammonia (with conditions and reaction)*
- *Its reactions with hydrogen chloride and with hot copper (II) oxide and chlorine (both chlorine in excess and ammonia in excess).*

All these reactions may be studied in terms of reactants, products, conditions, equations and observations.

- *Aqueous solution of ammonia - reaction with sulphuric acid, nitric acid, hydrochloric acid and solutions of iron(III) chloride, iron(II) sulphate, lead nitrate, zinc nitrate and copper sulphate.*

- *Uses of ammonia - manufacture of fertilizers, explosives, nitric acid, refrigerant gas (Chlorofluro carbon – and its suitable alternatives which are non-ozone depleting), and cleansing agents.*

C. Nitric Acid

Nitric Acid: one laboratory method of preparation of nitric acid from potassium nitrate or sodium nitrate. Large scale preparation. Nitric acid as an oxidizing agent.

- *Laboratory preparation of nitric acid from potassium nitrate or sodium nitrate; the laboratory method to be studied in terms of reactants, products, conditions, equations, setting up of apparatus, diagram, precautions, collection and identification.*
- *Manufacture of Nitric acid by Ostwald's process (Only equations with conditions where applicable).*
- *As an oxidising agent: its reaction with copper, carbon, sulphur*.

D. Sulphuric Acid

Large scale preparation, its behaviour as an acid when dilute, as an oxidizing agent when concentrated - oxidation of carbon and sulphur; as a dehydrating agent - dehydration of sugar and copper (II) sulphate crystals; its non-volatile nature.

- *Manufacture by Contact Process Equations with conditions where applicable).*
- *Its behaviour as an acid when dilute - reaction with metal, metal oxide, metal hydroxide, metal carbonate, metal bicarbonate*, metal *sulphite, metal sulphide.*
- *Concentrated sulphuric acid as an oxidizing agent - the oxidation of carbon and sulphur.*
- *Concentrated sulphuric acid as a dehydrating agent- (a) the dehydration of sugar (b) Copper (II) sulphate crystals.*
- *Non-volatile nature of sulphuric acid - reaction with sodium or potassium chloride and sodium or potassium nitrate.*

9. Organic Chemistry

(i) Introduction to Organic compounds.

- *Unique nature of Carbon atom – tetra valency, catenation.*
- *Formation of single, double and triple bonds, straight chain, branched chain, cyclic compounds (only benzene)*.

(ii) Structure and Isomerism.

- *Structure of compounds with single, double and triple bonds.*
- *Structural formulae of hydrocarbons. Structural formula must be given for: alkanes, alkenes, alkynes up to 5 carbon atoms*.
- *Isomerism – structural (chain, position)*

(iii) Homologous series – characteristics with examples.

Alkane, alkene, alkyne series and their gradation in properties and the relationship with the molecular mass or molecular formula.

(iv) Simple nomenclature.

Simple nomenclature of the hydrocarbons with simple functional groups – (double bond, triple bond, alcoholic, aldehydic, carboxylic group) longest chain rule and smallest number for functional groups rule – trivial and IUPAC names (compounds with only one functional group).

(v) Hydrocarbons: alkanes, alkenes, alkynes.

- *Alkanes - general formula; methane (greenhouse gas) and ethane - methods of preparation from sodium ethanoate (sodium acetate), sodium propanoate (sodium propionate), from iodomethane (methyl iodide) and bromoethane (ethyl bromide). Complete combustion of methane and ethane, reaction of methane and ethane with chlorine through substitution.*

- *Alkenes – (unsaturated hydrocarbons with a double bond); ethene as an example. Methods of preparation of ethene by dehydro halogenation reaction and dehydration reactions.*
- *Alkynes - (unsaturated hydrocarbons with a triple bond); ethyne as an example of alkyne; Methods of preparation from calcium carbide and 1,2 dibromoethane ethylene dibromide).*

Only main properties, particularly addition products with hydrogen and halogen namely Cl_2, Br_2 and I_2 pertaining to alkenes and alkynes.

- *Uses of methane, ethane, ethene, ethyne.*

(vi) Alcohols: ethanol – preparation, properties and **uses.**

- *Preparation of ethanol by hydrolysis of alkyl halide.*
- *Properties – Physical: Nature, Solubility, Density, Boiling Points. Chemical: Combustion, action with sodium, ester formation with acetic acid, dehydration with conc. Sulphuric acid to prepare ethene.*
- *Denatured and spurious alcohol.*
- *Important uses of Ethanol.*

(vii) Carboxylic acids (aliphatic - mono carboxylic acid): Acetic acid – properties and uses of acetic acid.

- *Structure of acetic acid.*
- *Properties of Acetic Acid: Physical properties – odour (vinegar), glacial acetic acid (effect of sufficient cooling to produce ice like crystals). Chemical properties – action with litmus, alkalis and alcohol (idea of esterification).*
- *Uses of acetic acid.*

INTERNAL ASSESSMENT OF PRACTICAL WORK

Candidates will be asked to observe the effect of ragents and/or of heat on substances supplied to them. The exercises will be simple and may include the recognition and identification of certain gases and ions listed below. The examiners will not, however, be restricted in their choice to substances containing the listed ions.

Gases: Hydrogen, Oxygen, Carbon dioxide, Chlorine, Hydrogen chloride, Sulphur dioxide, Hydrogen sulphide, Ammonia, Water vapour, Nitrogen dioxide.

Ions: Calcium, Copper, Iron, Lead, Zinc and Ammonium, Carbonate, Chloride, Nitrate, Sulphide, Sulphite and Sulphate.

Knowledge of a formal scheme of analysis is not required. Semi-micro techniques are acceptable but candidates using such techniques may need to adapt the instructions given to suit the size of the apparatus being used.

Candidates are expected to have completed the following minimum practical work:

1. Action of heat on the following substances:

   (a) Copper carbonate, zinc carbonate

   (b) zinc nitrate, copper nitrate, lead nitrate

   Make observations, identify the products and make deductions where possible (equations not required).

2. Make a solution of the unknown substance: add sodium hydroxide solution or ammonium hydroxide solution, make observations and give your deduction. Warming the mixture may be needed. Choose from substances containing Ca^{2+}, Cu^{2+}, Fe^{2+}, Fe^{3+}, Pb^{2+}, Zn^{2+}, NH_4^+.
3. Supply a solution of a dilute acid and alkali. Determine which is acidic and which is basic, giving two tests for each.
4. Add concentrated hydrochloric acid to each of the given substances, warm, make observations, identify any product and make deductions: (a) copper oxide (b) manganese dioxide.

EVALUATION

The assignments/project work are to be evaluated by the subject teacher and by an External Examiner. (The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the section/class**. For example, a teacher of Chemistry of Class VIII may be deputed to be an External Examiner for Class X Chemistry projects.)

The Internal Examiner and the External Examiner will assess the assignments independently.

Award of Marks **(20 Marks)**

Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on CISCE's CAREERS portal by the due date.

NOTE: According to the recommendation of International Union of Pure and Applied Chemistry (IUPAC), the groups are numbered from 1 to 18 replacing the older notation of groups IA …. VIIA, VIII, IB …… VIIB and 0. However, for the examination both notations will be accepted.

Old notation	IA	IIA	IIIB	IVB	VB	VIB	VIIB	VIII			IB	IIB	IIIA	IVA	VA	VIA	VIIA	0
New notation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

SCIENCE (52)

BIOLOGY

SCIENCE Paper - 3

Aims:

1. To acquire the knowledge of the economic importance of plants and animals.
2. To develop an understanding of the inter-relationship between sustainability and environmental adaptations.
3. To develop an understanding of the interdependence of plants and animals so as to enable pupils to acquire a clearer comprehension
4. of the significance of life and its importance in human welfare.
5. To understand the capacities and limitations of all the biological and economic activities so as to be able to use them for a better quality of life.
6. To acquire the ability to observe, experiment, hypothesize, infer, handle equipment accurately and make correct recordings.

CLASS IX

*There will be one paper of **two hours** duration of 80 marks and Internal Assessment of Practical Work carrying 20 marks.*

1. Basic Biology

(i) The cell, a unit of life, protoplasm, basic difference between prokaryotic and eukaryotic cell; differences between an animal and a plant cell.

- *A basic understanding of the cell theory, structure of plant and animal cell with functions of various cell organelles. (Protoplasm, Cytoplasm, Cell Wall, Cell Membrane, Nucleus, Nucleolus, Mitochondria, Endoplasmic Reticulum, Ribosome, Golgi bodies, Plastids, Lysosomes, Centrosome and Vacuole).*
- *Major differences between a prokaryotic and eukaryotic cell.*
- *Differences between a plant cell and an animal cell should be mainly discussed with respect to cell wall, centrosome, vacuoles and plastids.*

(ii) Tissues: Types of plant and animal tissues.

- *A brief understanding of their location, basic structure and functions with examples.*
- *A brief understanding of their role in different physiological processes in plants and animals.*

2. Flowering Plants

(i) Flower: Structure of a bisexual flower, functions of various parts.

- *A brief introduction to complete and incomplete flowers.*
- *Essential and non-essential whorls of a bisexual flower; their various parts and functions.*
- *Inflorescence and placentation (meaning only)*

(Charts or actual specimens may be used to help enhance clarity of concepts.)

(ii) Pollination: self and cross-pollination.

- *Explanation, advantages and disadvantages of self and cross-pollination.*
- *Agents of pollination and the characteristic features of flowers pollinated by various agents such as insects, wind, and water.*
- *A brief idea as to how nature favours cross pollination.*

(ii) Fertilisation.

- *Events taking place between pollination and fertilisation leading to the formation of zygote in the embryo sac.*
- *A brief explanation of the terms double fertilization and triple fusion.*

- *Fruit and Seed - definition and significance.*

3. Plant Physiology

(i) Structure of dicot and monocot seeds, Germination of seeds, types, and conditions for seed germination.

- *Structure and germination of Bean seed and Maize grain.*
- *Differences between monocot and dicot seeds.*
- *Differences between hypogeal and epigeal germination.*
- *Conditions for seed germination - To be explained and supported by experiments.*

(ii) Respiration in plants: outline of the process, gaseous exchange.

- *A brief outline of the process mentioning the terms Glycolysis, Krebs cycle and their significance.*
- *A reference to be made to aerobic and anaerobic respiration with chemical equations in each case.*
- *Experiments on gaseous exchange and on heat production.*

4. Diversity in living organisms

(i) A brief outline of the five Kingdom classification.

- *Main characteristics of each kingdom with suitable examples:*
  - *Monera, Protista, Fungi.*
  - *Plantae - Thallophyta, Bryophyta, Pteridophyta and Spermatophyta.*
- *Animalia - non-chordates from Porifera to Echinodermata and Chordates - all five Classes.*

(ii) Economic importance of Bacteria.

(a) Useful role of bacteria:

- *Medicine: antibiotics, serums and vaccines*
- *Agriculture: nitrogen cycle (role of nitrogen fixing, nitrifying and denitrifying bacteria)*
- *Industry -curing of tea, tanning of leather.*

(b) Harmful role of bacteria - spoilage of food, diseases in plants and animals, bio-weapons.

(iii) Economic importance of Fungi.

A brief idea of the useful role of Fungi in breweries, bakeries, cheese processing, and mushroom cultivation. (Processes of manufacture are not required).

5. Human Anatomy and Physiology

(a) Nutrition:

(i) Classes of food; balanced diet. Malnutrition and deficiency diseases.

- *Functions of carbohydrates, fats, proteins, mineral salts (calcium, iodine, iron and sodium), vitamins and water in proper functioning of the body.*
- *Sources of vitamins, their functions and deficiency diseases.*
- *Meaning and importance of a 'Balanced Diet'.*
- *Role of cellulose in our diet.*
- *Causes, symptoms and prevention of Kwashiorkor and Marasmus.*

(ii) The structure of a tooth, different types of teeth.

- *Structure of a tooth to be discussed with the help of a diagram.*
- *Functions of different types of teeth.*
- *Dental formula of an adult.*

(iii) Digestive System: Organs, digestive glands and their functions (including enzymes and their functions in digestion, absorption and assimilation of digested food).

- *Organs and glands of the digestive system and their functions with*

reference to digestion, absorption and assimilation.

- *brief idea of peristalsis.*

(b) Skeleton - Movement and Locomotion.

- Functions of human skeleton
- Axial and Appendicular Skeleton
- Types of joints with reference to their location*:*
  - *immovable joints*
  - *slightly movable joints*
  - *freely movable (hinge joint, ball and socket joint, gliding joint, pivot joint*.)

(c) Structure and functions of skin.

- *Various parts of the skin and their functions.*
- *Special derivatives of the skin with reference to sweat glands, sebaceous glands, hair, nails and mammary glands.*
- *Heat regulation - vasodilation and vasoconstriction.*

(d) Respiratory System: Organs; mechanism of breathing; tissue respiration, heat production.

- *Structures of the respiratory system.*
- *Differences between anaerobic respiration in plants and in man.*
- *Role of diaphragm and intercostal muscles in breathing to provide a clear idea of the breathing process.*
- *Brief idea of gaseous transport and tissue respiration.*
- *Brief understanding of respiratory volumes.*
- *Effect of altitude on breathing; asphyxiation and hypoxia.*

6. Health and Hygiene

(i) A brief introduction to maintaining good health.

General idea of personal hygiene, public hygiene and sanitation.

(ii) A brief introduction to communicable, non-communicable, endemic, epidemic, pandemic and sporadic diseases; modes of transmission.

- *Meaning of each of the above with examples.*
- *Modes of transmission: air borne, water borne; vectors (housefly, mosquito, cockroach).*

(iii) Bacterial, Viral, Protozoan, Helminthic diseases:

- *Bacterial: Cholera, typhoid, tuberculosis.*
- *Viral: AIDS, Chicken pox, Hepatitis.*
- *Protozoan: Malaria, Amoebic Dysentery, Sleeping sickness.*
- *Helminthic: Ascariasis, Taeniasis, Filiariasis.*

(symptoms and measures to control the above diseases.)

(Scientific names of causative agents not required).

(iv) Aids to Health: Active and passive immunity.

- *Meaning of Active and passive immunity.*
- *An understanding of the use and action of the following – vaccination, immunization, antitoxin, serum, antiseptics, disinfectants, antibiotics.*
- *An idea of the local defense system and its merits, difference between antiseptics and disinfectants.*

(v) Health Organisations: Red Cross, WHO.

Major activities of the Red Cross and WHO.

7. Waste generation and management

(a) Sources of waste - domestic, industrial, agricultural, commercial and other establishments.

- *Domestic waste: paper, glass, plastic, rags, kitchen waste, etc.*
- *Industrial: mining operations, cement factories, oil refineries, construction units.*
- *Agricultural: plant remains, animal waste, processing waste.*
- *Municipal sewage: Sewage, degradable and non-degradable waste from offices, etc.*
- *e-waste: brief idea about e-waste.*

(b) Methods of safe disposal of waste.

- *Segregation, dumping, composting, drainage, treatment of effluents before discharge, incineration, use of scrubbers and electrostatic precipitators.*
- *Segregation of domestic waste into biodegradable and non-biodegradable by households: garden waste to be converted to compost; sewage treatment plants.*

INTERNAL ASSESSMENT OF PRACTICAL WORK

The practical work is designed to test the ability of the candidates to make accurate observations from specimens of plants and animals.

PLANT LIFE

(i) The examination of an onion peel under the microscope to study various parts of the cell.

(ii) A cross-pollinated flower to be examined and identified and the parts to be studied and labelled e.g. Hibiscus.

(iii) Specimens of germinating seeds with plumule and radicle (the bean seed and maize grain) for examination, identification, drawing and labelling the parts.

ANIMAL LIFE

(i) The examination of a human cheek cell under the microscope to study various parts of the cell.

(ii) Identification of sugar, starch, protein and fat. through conduct of relevant tests.

(iii) Examination and identification of specimens belonging to the following groups of animals:

Non-Chordata - Porifera, Coelenterata, Platyhelminthes, Nemathelminthes Annelida, Arthropoda. Mollusca and Echinodermata.

Chordata- Pisces, Amphibia, Reptilia, Aves, Mammalia.

Identification of the structure of the following organs through specimens/models and charts: Lung and skin.

(iv) Experiments to show the mechanism of breathing.

Bell jar experiment should be discussed. Comparison should be made with the human lungs and respiratory tract to show the mechanism of breathing.

(v) Visit a few establishments in the locality such as motor repair workshops, kilns, pottery making units, fish and vegetable markets, restaurants, dyeing units. Find out the types of wastes and methods prevalent for their disposal. On the basis of the information collected prepare a report, suggest measures to improve the environmental conditions.

(vi) Visit a water treatment plant, sewage treatment plant or garbage dumping or vermicomposting sites in the locality and study their working.

CLASS X

There will be one paper of ***two hours*** *duration of 80 marks and Internal Assessment of practical work carrying 20 marks.*

1. Basic Biology

(i) Cell Cycle and Cell Division.

Cell cycle – Interphase (G_1, S, G_2) and Mitotic phase.

Cell Division:

- *Mitosis and its stages.*
- *A basic understanding of Meiosis as a reduction division (stages not required).*
- *A brief idea of homologous chromosomes and crossing over leading to variations.*
- *Significance and major differences between mitotic and meiotic division.*

(ii) Structure of chromosome.

Basic structure of chromosome with elementary understanding of terms such as chromatin, chromatid, gene structure of DNA and centromere.

(iii) Genetics: Mendel's laws of inheritance and sex-linked inheritance of diseases.

- *The three laws of Mendel.*
- *Monohybrid cross – phenotype and genotype.*
- *Dihybrid cross – Only phenotype.*
- *The following terms to be covered: gene, allele, heterozygous, homozygous, dominant, recessive, mutation, variation, phenotype, genotype.*
- *Sex determination in human beings.*

  Sex linked inheritance of diseases to include only X-linked like haemophilia and colour blindness.

2. Plant Physiology

(i) Absorption by roots, imbibition, diffusion and osmosis; osmotic pressure, root pressure; turgidity and flaccidity; plasmolysis and deplasmolysis; the absorption of water and minerals; active and passive transport (in brief); The rise of water up to the xylem; Forces responsible for ascent of sap.

- *Understanding of the processes related to absorption of water by the roots.*
- *Characteristics of roots, which make them suitable for absorbing water.*
- *Structure of a single full-grown root hair.*
- *A general idea of Cohesive, Adhesive forces and transpirational pull.*
- *Experiments to show the conduction of water through the xylem.*

(ii) Transpiration - process and significance. Ganong's potometer and its limitations. The factors affecting rate of transpiration. Experiments on transpiration. A brief idea of guttation and bleeding.

- *Concept of transpiration and its importance to plants*
- *Experiments related to transpiration:*

  (a) Loss in weight of a potted plant or a leafy shoot in a test tube as a result of transpiration.

  (b) Use of cobalt chloride paper to demonstrate unequal rate of transpiration in a dorsiventral leaf.
- *Mechanism of stomatal transpiration on the basis of potassium ion exchange theory.*
- *Adaptations in plants to reduce transpiration.*
- *A brief idea of guttation and bleeding.*

(iii) Photosynthesis: the process and its importance to life in general; experiments to show the necessity of light, carbon dioxide, chlorophyll, formation of starch and release of oxygen; carbon cycle.

- *The process and significance of Photosynthesis.*
- *The internal structure of chloroplast to be explained to give an idea of the site of light and dark reactions.*
- *Opening and closing of stomata based on potassium ion exchange theory.*
- *Overall balanced chemical equation to represent photosynthesis.*
- *Introduction of the terms "photochemical" for light phase and "biosynthetic" for dark phases.*
- *Light reaction - activation of chlorophyll followed by photolysis of water, release of O_2, formation of ATP (photophosphorylation) and NADPH.*
- *Dark reaction - only combination of hydrogen released by NADP with CO_2 to form glucose. (detailed equations are not required).*
- *Adaptations in plants for photosynthesis.*
- *Experiments with regard to the factors essential for photosynthesis; emphasis on destarching and the steps involved in starch test.*
- *A diagrammatic representation of "carbon cycle".*

(iv) Chemical coordination in Plants: A general study of plant growth regulators; Tropic movements in plants.

- *A brief idea of the physiological effects of Auxins, Gibberellins, Cytokinins, Abscisic acid and Ethylene in regulating the growth of plants.*
- *A basic understanding of the tropic movements in plants with reference to – Phototropism, Geotropism, Hydrotropism, Thigmotropism and Chemotropism (supported with suitable examples).*

3. Human Anatomy and Physiology

(i) Circulatory System: Blood and lymph, the structure and working of the heart, blood vessels, circulation of blood (only names of the main blood vessels entering and leaving the heart, liver and kidney will be required). Lymphatic system.

- *Composition of blood (structure and functions of RBC, WBC and platelets).*
- *Brief idea of tissue fluid and lymph.*
- *Increase in efficiency of mammalian red blood cells due to absence of certain organelles; reasons for the same.*
- *A brief idea of blood coagulation.*
- *Structure and working of the heart along with names of the main blood vessels entering and leaving the heart, the liver and the kidney.*
- *Concept of systole and diastole; concept of double circulation.*
- *Brief idea of pulse and blood pressure.*
- *Blood vessels: artery, vein and capillary to be explained with the help of diagrams to bring out the relationship between their structure and function.*
- *Brief idea of the lymphatic organs: spleen and tonsils.*
- *ABO blood group system, Rh factor.*
- *Significance of the hepatic portal system.*

(ii) Excretory System: A brief introduction to the excretory organs; parts of the urinary system; structure and function of the kidneys; blood vessels associated with kidneys; structure and function of nephron

- *A brief idea of different excretory organs in the human body.*
- *External and internal structure of the kidney;*
- *Parts of the urinary system along with the blood vessels entering and leaving the kidney; functions of various parts of the urinary system (emphasis on diagram with correct labelling). A general idea of the structure of a kidney tubule/ nephron.*

- *A brief idea of ultra-filtration (emphasis on the diagram of malpighian capsule); selective reabsorption and tubular secretion in relation to the composition of blood plasma and urine formed.*

(iii) Nervous system: Structure of Neuron; central, autonomous and peripheral nervous system (in brief); brain and spinal cord; reflex action and how it differs from voluntary action.

Sense organs – Eye: Structure, functions, defects and corrective measures: Ear: Parts and functions of the ear.

- *Parts of a neuron.*
- *Various parts of the external structure of the brain and its primary parts: Medulla Oblongata, Cerebrum, Cerebellum, Thalamus, Hypothalamus and Pons; their functions.*
- *Reference to the distribution of white and gray matter in Brain and Spinal cord.*
- *Voluntary and involuntary actions – meaning with examples.*
- *Diagrammatic explanation of the reflex arc, showing the pathway from receptor to effector.*
- *A brief idea of the peripheral and autonomic nervous system in regulating body activities.*
- *Differences between natural and acquired reflex.*
- *External and Internal structure and functions of the Eye and Ear and their various parts.*
- *A brief idea of stereoscopic vision, adaptation and accommodation of eye.*
- *Defects of the eye (*myopia, hyperopia hypermetropia, presbyopia, astigmatism and cataract) *and corrective measures (diagrams included for myopia and hyperopia only)*
- *The course of perception of sound in human ear.*
- *Role of ear in maintaining balance of the body.*

(iv) Endocrine System: General study of the following glands: Adrenal, Pancreas, Thyroid and Pituitary. Endocrine and Exocrine glands.

- *Differences between Endocrine and Exocrine glands.*
- *Exact location and shape of the endocrine glands in the human body.*
- *Hormones secreted by the following glands: Pancreas: insulin and glucagon; Thyroid: only thyroxin; Adrenal gland: Cortical hormones and adrenaline; Pituitary: growth hormone, tropic hormones, ADH and oxytocin.*
- *Effects of hypo secretion and hyper secretion of hormones.*
- *A brief idea of Feedback mechanism with reference to TSH.*

(v) The Reproductive System: Organs, fertilisation functions of placenta in the growth of the embryo Menstrual cycle.

- *Functions of Male and Female reproductive organs and male accessory glands. An idea of secondary sexual characters.*
- *Structure and functions of the various parts of the sperm and egg.*
- *Explanation of the terms: Fertilization, implantation, placenta, gestation and parturition.*
- *A brief idea of the role of placenta in nutrition, respiration and excretion of the embryo; its endocrinal function.*
- *Functions of Foetal membranes and amniotic fluid.*
- *Menstrual cycle outline of menstrual cycle.*
- *Role of Sex hormones: Testosterone, Oestrogen and Progesterone in reproduction.*
- *Identical and fraternal twins: meaning and differences only.*

4. Population

Population explosion in India; need for adopting control measures - population control.

- *Main reasons for the sharp rise in human population in India and in the world.*
- *A brief explanation of the terms: demography, population density, birth rate, death rate and growth rate of population.*
- *Problems faced due to population explosion: unemployment, over exploitation of natural resources, low per capita income, price rise, pollution, unequal distribution of wealth.*
- *Methods of population control: Surgical methods – Tubectomy and vasectomy.*

5. Human Evolution

Basic introduction to Human evolution and Theories of evolution: Lamarck's theory of inheritance; Darwin's theory of evolution by natural selection.

- *A brief idea of human ancestors – Australopithecus, Homo habilis, Homo erectus, Neanderthals, Cro-Magnon and Homo sapiens sapiens (Modern Man) with reference to the following characteristics:*
  - *Bipedalism*
  - *Increasing Cranial capacity*
  - *Reduction of size of canine teeth*
  - *Forehead and brow ridges*
  - *Development of chin*
  - *Reduction in body hair*
  - *Height and Posture*
- *Lamarck's theory of inheritance of acquired characteristics – with reference to use of organs (e.g.: neck and forelimbs of giraffe) and disuse of organs (e.g.: vestigial organs in humans like wisdom teeth, vermiform appendix, pinnae).*
- *Darwin's theory of Natural selection: Survival of the fittest - e.g. adaptation of peppered moth.*

6. Pollution

(i) Types and sources of pollution; major pollutants.

- *Air: Vehicular, industrial, burning garbage, brick kilns.*
- *Water: Household detergents, sewage, industrial waste, oil spills.*
- *Thermal pollution.*
- *Soil: Industrial waste, urban commercial and domestic waste, chemical fertilizers.*
- *Biomedical waste – used and discarded needles, syringes, soiled dressings etc.*
- *Radiation: X-rays; radioactive fallout from nuclear plants.*
- *Noise: Motor Vehicles, Industrial establishments, Construction Sites, Loudspeakers etc.*

(ii) Biodegradable and Non-biodegradable wastes

Biodegradable wastes: meaning and example; paper, vegetable peels, etc.

Non-biodegradable wastes: meaning and example; plastics, glass, Styrofoam etc. Pesticides like DDT etc.

(iii) Effects of pollution on climate, environment, human health and other organisms; control measures.

- *Brief explanation of: Greenhouse effect and Global warming, Acid rain, Ozone layer depletion.*
- *Measures to control pollution:*
  - *Use of unleaded petrol / CNG in automobiles*
  - *Switching of engines at traffic signal lights*
  - *Social forestry*
  - *Setting of sewage treatment plants*
  - *Ban on polythene and plastics*
  - *Organic farming*
  - *Euro Bharat vehicular standard.*

  (A brief idea of the above measures)
- *A brief mention of "Swachh Bharat Abhiyan"- A national campaign for Clean India.*

INTERNAL ASSESSMENT OF PRACTICAL WORK

The practical work is designed to test the ability of the candidates to make an accurate observation from specimens of plants and animals.

PLANT LIFE

(i) Observation of permanent slides of stages of mitosis.

(ii) Experiments demonstrating:

- Diffusion: using potassium permanganate in water.
- Osmosis: Thistle Funnel experiment and potato osmoscope.
- Absorption: using a small herbaceous plant.

(iii) Experiments on Transpiration:

- demonstration of the process using a Bell Jar.
- demonstration of unequal transpiration in a dorsiventral leaf using cobalt chloride paper.
- demonstration of uptake of water and the rate of transpiration using Ganong's potometer.

(iv) Experiments on Photosynthesis:

- to show the necessity of light, carbon dioxide and chlorophyll-for photosynthesis.
- to show the release of O_2 during photosynthesis using hydrilla / elodea.

ANIMAL LIFE

(i) Identification of the structures of the urinary system, heart and kidney (internal structure) and brain (external view) through models and charts

(ii) The identification of different types of blood cells under a microscope.

(iii) Identification of the internal structure of the Ear and Eye (Through models and charts).

(iv) Identification and location of selected endocrine glands: Adrenal, Pancreas, Thyroid and Pituitary glands with the help of a model or chart.

EVALUATION

The practical work/project work are to be evaluated by the subject teacher and by an External Examiner. (The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the relevant section/class**. For example, a teacher of Biology of Class VIII may be deputed to be an External Examiner for Class X, Biology projects.)

The Internal Examiner and the External Examiner will assess the practical work/project work independently.

Award of marks	**(20 Marks)**
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on CISCE's CAREERS portal by the due date.

INTERNAL ASSESSMENT IN SCIENCE - GUIDELINES FOR MARKING WITH GRADES

Criteria	Preparation	Procedure/ Testing	Observation	Inference/ Results	Presentation
Grade I (4 marks)	Follows instructions (written, oral, diagrammatic) with understanding; modifies if needed. Familiarity with and safe use of apparatus, materials, techniques.	Analyses problem systematically. Recognises a number of variables and attempts to control them to build a logical plan of investigation.	Records data/observations without being given a format. Comments upon, recognises use of instruments, degree of accuracy. Recording is systematic.	Processes data without format. Recognises and comments upon sources of error. Can deal with unexpected results, suggesting modifications.	Presentation is accurate and good. Appropriate techniques are well used.
Grade II (3 marks)	Follows instructions to perform experiment with step-by-step operations. Awareness of safety. Familiarity with apparatus, materials and techniques.	Specifies sequence of operation; gives reasons for any change in procedure. Can deal with two variables, controlling one.	Makes relevant observations. No assistance is needed for recording format that is appropriate.	Processes data appropriately as per a given format. Draws qualitative conclusions consistent with required results.	Presentation is adequate. Appropriate techniques are used.
Grade III (2 marks)	Follows instructions to perform a single operation at a time. Safety awareness. Familiarity with apparatus & materials.	Develops simple experimental strategy. Trial and error modifications made to proceed with the experiment.	Detailed instructions needed to record observations. Format required to record results.	Processes data approximately with a detailed format provided. Draws observations qualitative conclusions as required.	Presentation is reasonable, but disorganised in some places. Overwriting; rough work is untidy.
Grade IV (1 mark)	Follows some instructions to perform a single practical operation. Casual about safety. Manages to use apparatus & materials.	Struggles through the experiment. Follows very obvious experimental strategy.	Format required to record observations/ readings but tends to make mistakes in recording.	Even when detailed format is provided, struggles or makes errors while processing data. Reaches conclusions with help.	Presentation is poor and disorganised but follows an acceptable sequence. Rough work missing or untidy.
Grade V (0 marks)	Not able to follow instructions or proceed with practical work without full assistance. Unaware of safety.	Cannot proceed with the experiment without help from time to time.	Even when format is given, recording is faulty or irrelevant.	Cannot process results, nor draw conclusions, even with considerable help.	Presentation unacceptable; disorganised, untidy/ poor. Rough work missing.

COMPUTER APPLICATIONS (86)

Aims:

1. To empower students by enabling them to build their own applications.
2. To introduce students to some effective tools to enable them to enhance their knowledge, broaden horizons, foster creativity, improve the quality of work and increase efficiency.
3. To develop logical and analytical thinking so that they can easily solve interactive programs.
4. To help students learn fundamental concepts of computing using object oriented approach in one computer language.
5. To provide students with a clear idea of ethical issues involved in the field of computing.

CLASS IX

*There will be **one** written paper of **two hours** duration carrying 100 marks and Internal Assessment of 100 marks.*

THEORY – 100 Marks

1. Introduction to Object Oriented Programming concepts

(i) Principles of Object Oriented Programming, (Difference between Procedure Oriented and Object oriented).
All the four principles of Object Oriented Programming should be defined and explained using real life examples (Data abstraction, Inheritance, Polymorphism, Encapsulation).

(ii) Introduction to JAVA - Types of java programs – Applets and Applications, Java Compilation process, Java Source code, Byte code, Object code, Java Virtual Machine (JVM), Features of JAVA.

Definition of Java applets and Java applications with examples, steps involved in compilation process, definitions of source code, byte code, object code, JVM, features of JAVA - Simple, Robust, secured, object oriented, platform independent, etc.

2. Elementary Concept of Objects and Classes

Modelling entities and their behaviour by objects, a class as a specification for objects and as an object factory, computation as message passing/method calls between objects (many examples should be done to illustrate this). Objects encapsulate state (attributes) and have behaviour (methods). Class as a user defined data type.

A class may be regarded as a blueprint to create objects. It may be viewed as a factory that produces similar objects. A class may also be considered as a new data type created by the user, that has its own functionality.

3. Values and data types

Character set, ASCII code, Unicode, Escape sequences, Tokens, Constants and Variables, Data types, type conversions.

Escape sequences [\n, \t, \\, \", \'], Tokens and its types [keywords, identifiers, literals, punctuators, operators], primitive types and non-primitive types with examples, Introduce the primitive types with size in bits and bytes, Implicit type conversion and Explicit type conversion.

4. Operators in Java

Forms of operators, Types of operators, Counters, Accumulators, Hierarchy of operators, 'new' operator, dot (.) operator.

Forms of operators (Unary, Binary, Ternary), types of operators (Arithmetic, Relational, Logical, Assignment, Increment, Decrement, Short hand operators), Discuss precedence and associativity of operators, prefix and postfix, Creation of dynamic

memory by using new operator, invoking members of class using dot operator, Introduce System.out.println() and System.out.print() – for simple output.

(Bitwise and shift operators are not included).

5. Input in Java

Initialization, Parameter, introduction to packages, Input streams (Scanner Class), types of errors, types of comments

Initialization – Data before execution, Parameters – at the time of execution, input stream – data entry during execution – using methods of Scanner class [nextShort(), nextInt( ), nextLong( ), nextFloat ( ), nextDouble( ), next( ), nextLine( ), next ( ) .charAt(0)]

Discuss different types of errors occurring during execution and compilation of the program (syntax errors, runtime errors and logical errors).Single line comment (//) and multiline comment (/ ... */)*

6. Mathematical Library Methods

Introduction to package java.lang [default], methods of Math class.

pow(x,y), sqrt(x), cbrt(x), ceil(x), floor(x), round (x), abs(a), max(a, b), min(a,b), random( ).

Java expressions – using all the operators and methods of Math class.

7. Conditional constructs in Java

Application of if, if else, if else if ladder, switch-case, default, break.

if, if else, if else if, Nested if, switch case, break statement, fall through condition in switch case, Menu driven programs, System.exit(0) - to terminate the program.

8. Iterative constructs in Java

Definition, Types of looping statements, entry controlled loops [for, while], exit controlled loop [do while] , variations in looping statements, and Jump statements.

Syntax of entry and exit controlled loops, break and continue, Simple programs illustrating all three loops, inter conversion from for – while – do while, finite and infinite, delay, multiple counter variables (initializations and updations). Demonstrate break and continue statements with the help of loops.

Loops are fundamental to computation and their need should be shown by examples.

9. Nested for loops

Introduce nested loops through some simple examples. Demonstrate break and continue statements with the help of nested loops.

Programs based on nested loops [rectangular, triangular [right angled triangle only] patterns], series involving single variable.

(Nested while and nested do while are not included.)

10. Computing and Ethics

Ethical Issues in Computing.

Intellectual property rights; protection of individual's right to privacy; data protection on the internet; protection against Spam; software piracy, cybercrime, hacking, protection against malicious intent and malicious code. The stress should be on good etiquette and ethical practices.

INTERNAL ASSESSMENT - 100 Marks

This segment of the syllabus is totally practical oriented. The accent is on acquiring basic programming skills quickly and efficiently.

Programming Assignments (Class IX)

Students are expected to do a minimum of 20 assignments during the whole year to reinforce the concepts studied in the class.

Suggested list of Assignments:

The laboratory assignments will form the bulk of the course. Good assignments should have problems which require design, implementation and testing. They should also embody one or more concepts that have been discussed in the theory class. A significant proportion of the time has to be spent in the laboratory. Computing can only be learnt by doing.

The teacher-in-charge should maintain a record of all the assignments done as a part of practical work throughout the year and give it due credit at the time of cumulative evaluation at the end of the year.

Some sample problems are given below as examples. The problems are of varying levels of difficulty:

(i) Programs using Assignment statements.
Example: Calculation of Area / Volume / Conversion of temperature / Swapping of values etc.

(ii) Programs based on– Input through parameters.
Example: Implementation of standard formula etc.

(iii) Programs based on – Input through Scanner class.
Example: Implementation of standard formula etc.

(iv) Programs based on Mathematical methods.
Example: larger/smaller of two numbers, cube root, square root, absolute value, power, etc.

(v) Programs based on if, if else, if else if ladder, nested if etc.

(a) if programs

- Larger / smaller of two numbers
- To check divisibility of a number, etc.

(b) if - else programs

- Odd or even number
- Eligibility to vote
- Upper case or lower case
- Positive or negative number
- Vowel or Consonant
- Buzz number etc.

(c) if-else-if programs

- Programs based on discount/interest/ bonus/ taxes/ commission.
- Programs based on slab system.
- Programs based on Nested if.

(vi) Programs on switch case.

(a) Day of a week
(b) Name of the month
(c) Names of the seasons
(d) Calculator
(e) Vowel or consonant etc.

(vii) Programs based on Looping Statement

(a) Programs based on for looping statement.

(b) Programs based on printing simple series, summation of simple series, product of simple series.

(c) Prime number, perfect number, composite number, Fibonacci series. Lowest Common Multiple (LCM), Highest Common Factor (HCF) etc.

(d) To find the biggest and smallest number from *n* number of entered numbers.

(e) Program based on while loop like Armstrong number, Spy number, Niven number, Palindrome number, etc.

(viii) Programs based on nested loops [rectangular, triangular(right angled triangle only) patterns], series involving single variable.

(ix) Generate first *n* multiples of numbers from 1 to the limit input by the user.

(x) Menu Driven programs.

Important: This list is indicative only. Teachers and students should use their imagination to create innovative and original assignments.

EVALUATION

Proposed Guidelines for Marking

The teacher should use the criteria below to judge the internal work done. Basically, four criteria are being suggested: class design, coding and documentation, variable description and execution or output. The actual grading will be done by the teacher based on his/her judgment. However, one possible way: divide the outcome for each criterion into one of 4 groups: excellent, good, fair/acceptable, poor/unacceptable, then use numeric values for each grade and add to get the total.

Class design:

Has a suitable class (or classes) been used?
Are all attributes with the right kinds of types present?
Is encapsulation properly done?
Is the interface properly designed?

Coding and Documentation:

Is the coding done properly? (choice of names, no unconditional jumps, proper organization of conditions, proper choice of loops, error handling code layout). Is the documentation complete and readable? (class documentation, variable documentation, method documentation, constraints, known bugs – if any).

Variable and Description

Format for variable description:

Name of the variable	Data Type	Purpose/Description

Evaluation of practical work (Assignments) will be done as follows:

Subject Teacher (Internal Examiner): 100 Marks

Criteria (Total-100 marks)	Class design (20 marks)	Variable description (20 marks)	Coding and Documentation (20 marks)	Execution OR Output (40 marks)
Excellent	20	20	20	40
Good	16	16	16	32
Fair	12	12	12	24
Poor	8	8	8	16

CLASS X

*There will be **one** written paper of **two hours** duration carrying 100 marks and Internal Assessment of 100 marks.*

THEORY – 100 Marks

1. Revision of Class IX Syllabus

(i) Introduction to Object Oriented Programming concepts, (ii) Elementary Concept of Objects and Classes, (iii) Values and Data types, (iv) Operators in Java, (v) Input in Java, (vi) Mathematical Library Methods, (vii) Conditional constructs in Java, (viii) Iterative constructs in Java, (ix) Nested for loops.

2. Class as the Basis of all Computation

Objects and Classes

Objects encapsulate state and behaviour – numerous examples; member variables; attributes or features. Variables define state; member methods; Operations/methods/messages/ methods define behaviour.

Classes as abstractions for sets of objects; class as an object factory; primitive data types, composite data types. Variable declarations for both types; difference between the two types. Objects as instances of a class.
Consider real life examples for explaining the concept of class and object.

3. User - defined Methods

Need of methods, syntax of methods, forms of methods, method definition, method calling, method overloading, declaration of methods,

Ways to define a method, ways to invoke the methods – call by value [with programs] and call by reference [only definition with an example], Object creation - invoking the methods with respect to use of multiple methods with different names to implement modular programming, using data members and member methods, Actual parameters and formal parameters, Declaration of methods - static and non-static, method prototype / signature, - Pure and impure methods, - pass by value [with programs] and pass by reference [only definition with an example], Returning values from the methods , use of multiple methods and more than one method with the same name (polymorphism - method overloading).

4. Constructors

Definition of Constructor, characteristics, types of constructors, use of constructors, constructor overloading.
Default constructor, parameterized constructor, constructor overloading., Difference between constructor and method.

5. Library classes

Introduction to wrapper classes, methods of wrapper class and their usage with respect to numeric and character data types. Autoboxing and Unboxing in wrapper classes.

Class as a composite type, distinction between primitive data type and composite data type or class types. Class may be considered as a new data type created by the user, that has its own functionality. The distinction between primitive and composite types should be discussed through examples. Show how classes allow user defined types in programs. All primitive types have corresponding class wrappers. Introduce Autoboxing and Unboxing with their definition and simple examples.

The following methods are to be covered:

int parseInt(String s),

long parseLong(String s),

float parseFloat(String s),

double parseDouble(String s),

boolean isDigit(char ch),

boolean isLetter(char ch),

boolean isLetterOrDigit(char ch),

boolean isLowerCase(char ch),

boolean isUpperCase(char ch),

boolean isWhitespace(char ch),

char toLowerCase (char ch)

char toUpperCase(char ch)

6. Encapsulation

Access specifiers and its scope and visibility.

Access specifiers – private, protected and public. Visibility rules for private, protected and public access specifiers. Scope of variables, class variables, instance variables, argument variables, local variables.

7. Arrays

Definition of an array, types of arrays, declaration, initialization and accepting data of single and double dimensional arrays, accessing the elements of single dimensional and double dimensional arrays.

Arrays and their uses, sorting *techniques - selection sort and bubble sort; Search techniques – linear search and binary search, Array as a composite type, length statement to find the size of the array (sorting and searching techniques using single dimensional array only).*

Declaration, initialization, accepting data in a double dimensional array, sum of the elements in row, column and diagonal elements [right and left], display the elements of two-dimensional array in a matrix format.

8. String handling

String class, methods of String class, implementation of String class methods, String array

The following String class methods are to be covered:

String trim ()

String toLowerCase()

String toUpperCase()

int length( )

char charAt (int n)

int indexOf(char ch)

int lastIndexOf(char ch)

String concat(String str)

boolean equals (String str)

boolean equalsIgnoreCase(String str)

int compareTo(String str)

int compareToIgnoreCase(String str)

String replace (char oldChar,char newChar)

String substring (int beginIndex)

String substring (int beginIndex, int endIndex)

boolean startsWith(String str)

boolean endsWith(String str)

String valueOf(all types)

Programs based on the above methods, extracting and modifying characters of a string, alphabetical order of the strings in an array [Bubble and Selection sort techniques], searching for a string using linear search technique.

INTERNAL ASSESSMENT - 100 Marks

This segment of the syllabus is totally practical oriented. The accent is on acquiring basic programming skills quickly and efficiently.

Programming Assignments (Class X)

The students should complete a minimum of 20 laboratory assignments during the whole year to reinforce the concepts studied in class.

Suggested list of Assignments:

The laboratory assignments will form the bulk of the course. Good assignments should have problems which require design, implementation and testing. They should also embody one or more concepts that have been discussed in the theory class. A significant proportion of the time has to be spent in the laboratory. Computing can only be learnt by doing.

The teacher-in-charge should maintain a record of all the assignments done by the student throughout the year and give it due credit at the time of cumulative evaluation at the end of the year.

Some sample problems are given below as examples. The problems are of varying levels of difficulty:

(i) User defined methods

(a) Programs depicting the concept of pure, impure, static, non- static methods.

(b) Programs based on overloaded methods.

(c) Programs involving data members, member methods invoking the methods with respect to the object created.

(ii) Constructors

(a) Programs based on different types of constructors mentioned in the scope of the syllabus.

(b) Programs / outputs based on constructor overloading

(iii) Library classes

(a) Outputs based on all the methods mentioned in the scope of the syllabus.

(b) Programs to check whether a given character is an uppercase/ lowercase / digit etc.

(iv) Encapsulation

Questions based on identifying the different variables like local, instance, arguments, private, public, class variable etc.

(v) Arrays

(a) Programs based on accessing the elements of an array.

(b) Programs based on sort techniques mentioned in the scope of the syllabus.

(c) Programs based on search techniques mentioned in the scope of the syllabus.

(d) Programs on Double dimensional arrays as given in the scope of the syllabus.

(vi) String handling

(a) Outputs based on all the string methods mentioned in the scope of the syllabus.

(b) Programs based on extracting the characters from a given string and manipulating the same.

(c) Palindrome string, pig Latin, alphabetical order of characters, etc.

Important: This list is indicative only. Teachers and students should use their imagination to create innovative and original assignments.

EVALUATION

The teacher-in-charge shall evaluate all the assignments done by the student throughout the year [both written and practical work]. He/she shall ensure that most of the components of the syllabus have been used appropriately in the assignments. Assignments should be with appropriate list of variables and comment statements. The student has to mention the output of the programs.

Proposed Guidelines for Marking

The teacher should use the criteria below to judge the internal work done. Basically, four criteria are being suggested: class design, coding and documentation, variable description and execution or output. The actual grading will be done by the teacher based on his/her judgment. However, one possible way: divide the outcome for each criterion into one of 4 groups: excellent, good, fair/acceptable, poor/unacceptable, then use numeric values for each grade and add to get the total.

Class design:

Has a suitable class (or classes) been used?
Are all attributes with the right kinds of types present?
Is encapsulation properly done?
Is the interface properly designed

Coding and documentation:

Is the coding done properly? (Choice of names, no unconditional jumps, proper organization of conditions, proper choice of loops, error handling, code layout) Is the documentation complete and readable? (class documentation, variable documentation, method documentation, constraints, known bugs - if any).

Variable description:

Format for variable description:

Name of the Variable	Data Type	Purpose/description

Execution or Output:

Does the program run on all sample input correctly?

Evaluation of practical work will be done as follows:

Subject Teacher (Internal Examiner)				50 marks
External Examiner				50 marks
Criteria (Total-50 marks)	**Class design (10 marks)**	**Variable description (10 marks)**	**Coding and Documentation (10 marks)**	**Execution OR Output (20 marks)**
Excellent	**10**	**10**	**10**	**20**
Good	**8**	**8**	**8**	**16**
Fair	**6**	**6**	**6**	**12**
Poor	**4**	**4**	**4**	**8**

An External Examiner shall be nominated by the Head of the School and may be a teacher from the faculty, but not teaching the subject in the relevant section/class. For example, A teacher of Computer Science of class VIII may be deputed to be the External Examiner for class X.

The total marks obtained out of 100 are to be sent to CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on CISCE's CAREERS portal by the due date.

EQUIPMENT

There should be enough computer systems to provide for a teaching schedule where at least three-fourth of a time available is used for programming and assignments/practical work. The course shall require at least 4 periods of about 40 minutes duration per week. In one week, out of 4 periods the time should be divided as follows:

- 2 periods – Lecture cum demonstration by the Instructor.
- 2 periods – Assignments/Practical work.

The hardware and software platforms should be such that students can comfortably develop and run programs on those machines.

Since hardware and software evolve and change very rapidly the schools shall need to upgrade them as required. Following are the minimal specifications as of now.

RECOMMENDED FACILITIES:

- A lecture cum demonstration room with a MULTIMEDIA PROJECTOR/ an LCD and Overhead Projector (OHP) attached to the computer.
- A white board with white board markers should be available.
- A fully equipped Computer Laboratory that allows one computer per student.
- The computers should have a minimum of 1 GB RAM and at least a P - IV or Equivalent Processor.
- Good Quality printers.
- A scanner, a web cam/a digital camera (Should be provided if possible).

SOFTWARE FOR CLASSES IX & X

Any suitable Operating System can be used.

For teaching fundamental concepts of computing using object oriented approach, Blue J environment (3.2 or higher version) compatible with JDK (5.0 or higher version) as the base or any other editor or IDE, compatible with JDK (5.0 or higher version) as the base may be used. Ensure that the latest versions of software are used.

SOCIALLY USEFUL PRODUCTIVE WORK AND COMMUNITY SERVICE

CLASSES IX-X

Emphasis should be placed on work practice and classroom discussions in these classes. A component of Contemporary Studies ***may be*** correlated with SUPW.

Work practice will include *one* main craft or equivalent service and at least *one* subsidiary craft or equivalent service.

MAIN CRAFTS/SERVICES

(i) Health and Hygiene

Growing medical plants; eradication of communicable diseases; paramedical service.

(ii) Food

Agro-industries; kitchen gardening; compost culture; crop and seed production; repair of farm implements; soil conservation and desert control; horticulture; animal husbandry and dairying; bee keeping; poultry farming; fish culture; bakery; confectionery; cooking.

(iii) Shelter

Pottery; Masonry work; Workshop practice (mechanical); Workshop practice (electrical); Workshop practice (electronics); Cane and bamboo work; House-craft; Black smithy; Foundry work; Carpet weaving.

(iv) Clothing

Production of cotton; wool; silk and other fibres; Weaving; Dressmaking; Knitting; Hosiery work; Embroidery work; Dress designing; Leatherwork.

(v) Cultural and Recreational

Making toys and puppets; Making and repairing musical instruments; Making games material; Printing; Bookbinding; Making stationery; Photography.

SUBSIDARY CRAFTS/SERVICES

(i) Health and Hygiene

Cleanliness of the neighbourhood, well and pond and the disposal of garbage; construction of toilet facilities and compost pits; making tooth picks, tooth powder; soap; detergents; disinfectants; first aid boxes; construction of wastepaper-baskets; dustbins; garbage cans; brooms; brushes; cobweb cleaners; dusters; mops, etc.; detection of adulteration.

(ii) Food

Distribution of fertilisers and insecticides; processing and preservation of food; hydroponics; mushroom culture; khandsari, gur and candy making; catering; making jam; jelly, squashes, pickles, bari and papad, etc.; packing food; marketing.

(iii) Shelter

Home, village and town-planning.

Lac culture.

Renovation and effecting minor repairs in buildings, fittings, furniture and household articles. Decorating the home; gardening; surface decoration; interior decoration; construction of decorative pieces; plaster of Paris work; chalk and candle making; making limestone.

(iv) Clothing

Spinning of different fibres; Dyeing and printing; Repair of garments; Laundry work.

(v) Cultural and Recreational

Stagecraft; making costumes; holding exhibitions.

Further Suggestion on Socially Useful Productive Work:

Given below is an indication of how Socially Useful Productive Work can be combined with the 'sixth subject' to be offered in the ICSE examination:

Allied Subject Craft - Socially Useful Productive Work

1. Art		(i) Pottery work
		(ii) Sculpture: any medium
		(iii) Weaving: any medium
		(iv) Block printing, screen-printing, batik, tie and dye, etc. on any material.
		(v) Embroidery.
		(vi) Puppet or marionette making.
		(vii) Printing from original wood or lino block.
2. Technical Drawing Applications		(i) Woodwork or Metal work.
3. Home Science		(i) Laundry Work or Practical Cookery or Care of a House.
4. Cookery		(i) Practical Cookery.
5. Fashion Designing		(i) Needlework and Dressmaking.
6. Music	(a) Indian	(i) Vocal, Instrumental, Tabla,
	(b) Western	(i) Piano or other instrument.

ASSESSMENT: (Classes IX and X)

Evaluation is an important aspect of planning and execution of the Socially Useful Productive Work and Community Service Programme in Schools. From the beginning of the programme each step needs evaluation. An illustrative guide to the areas of assessment and weightage to be given is contained in the following paragraphs.

1. Selection of Socially Useful Productive Work and Community Service.

Suggested lists of the Main Crafts/Services and Subsidiary Crafts/ Services have been given in the syllabus booklet. Candidates will be required to select one main craft and one subsidiary service OR one main service and one subsidiary craft per year of preparation for the examination, i.e. Class IX and X.

2. Internal Assessment

The Internal Assessments will consist of assessment in (a) Socially Useful Productive Work (b) Community Service. The work undertaken by the candidates during the two-year preparation period in each will be assessed and marked out of 50. From these assessments they will be placed in an order of merit list giving them marks out of a total of 100. The CISCE reserves the right to call for the records of the candidates' work.

3. Socially Useful Productive Work

(i) This will be taken to mean work practice in a main or subsidiary craft. In contrast to community service it implies the making of articles of social use or the practice of a skill.

(ii) The areas of assessment of Socially Useful Productive work may be classified as follows:

	Marks
(1) Preparation	05
(2) Organisation	10
(3) Skills	20
(4) Research	10
(5) Interest	05

(iii) *Preparation:* It is important to select a craft which is socially useful and within the candidates' capabilities. It may be necessary to visit localities where certain crafts are practiced and note details of the processes or methods involved.

(iv) *Organisation:* The candidates should be able to explain in writing, the tools, materials and processes required as well as draw up a timetable/ programme of work.

(v) *Skills:* The manual skills of the candidates should be assessed regularly and from the finished product(s) and include the candidates' abilities to follow processes/ methods of the craft.

(vi) *Research:* This is the candidates' ability to analyse a process or method and suggest/ implement improvements and also to improvise wherever necessary.

(vii) *Interest:* This is an assessment of candidates' industriousness, constancy and conscientiousness with regard to the work undertaken. The candidates should be able to adhere to the timetable/ programme of work drawn up by them.

(viii) Record Card: This should be kept for each candidate and the assessment of Socially Useful Productive Work entered in it. A specimen of the record card is given below for guidance.

(ix) Interpretation of Grades:

Grade	*Standard*
A	Very Good
B	Good
C	Satisfactory
D	Fair
E	Unsatisfactory (Fail)

NAME OF THE SCHOOL

Internal Assessment Card for Socially Useful Productive Work

Name of the Candidate: _____

Craft/Skill: _____

ASSESSMENT RECORD

Date of Assessment	Areas of Assessment									
	Preparation		Organisation		Skills		Research		Interest	
	Grade	Points	Grade	Points	Grade	Points	Grade	Points	Grade	Points

4. Community Service

(i) This will be taken to mean work done in the home, school and outside which is beneficial to the community.

(ii) The areas of assessment for community service may be as under:

		Marks
(1)	Preparation	05
(2)	Organisation	10
(3)	Skills	20
(4)	Resourcefulness	10
(5)	Interest	05

(iii) *Preparation:* It is important to select a service that will be beneficial to the community. It may be necessary to form teams or squads and to select a leader.

(iv) *Organisation* is the knowledge of the tools, materials and methods/process by which the work can be done, and the ability to draw up a timetable or programme of work.

(v) *Skills* are the manipulative skills of doing the work. The quality of the candidates' work should be assessed.

(vi) *Resourcefulness* is the ability to complete the work in spite of problems and difficulties and to improvise wherever necessary.

(vii) *Interest* is the assessment of the candidates' constancy, industriousness and conscientiousness in doing the work and their abilities to adhere to the timetable or programme drawn up by them.

(viii) A *record card* on the lines suggested for Socially Useful Productive Work should be kept.

(ix) **A practical scheme** for day schools is given below:

(a) In the case of day schools, parents should be involved in making their children aware of their responsibilities in the home and to persons in the area in which they live. They should be encouraged to render Service in the home and to their neighbours. Such service may take the form of helping parents in cleaning the house, making the beds, assisting in the kitchen, cleaning the backyard, helping in the garden, visiting the sick, teaching a child or children in the neighbourhood, and so on.

Experiments should be tried in every school in which there are day scholars. Parents should be asked to give each child a job of work to do which will last between 20 minutes to half-an-hour each day.

(b) A diary should be kept for each child in which the parents enter each day:

(i) Nature of work;

(ii) Time allotted:

(iii) Remark of the parent;

(iv) Signature of the parent.

Thus, it will be possible for the school to ensure that children do at least three to three-and-half hours of *Socially Useful Productive Work*, per week.

(c) The number of hours as far as the Community Service (*Social Service*) is concerned, in the case of day scholars, will then be written the home and the neighbourhood and may rightly be termed 'Homework'. The remarks to be entered by the parent should be specified, so that they may be converted into grades.

(d) A suggested five points "*remarks*" scale is given below:

A -	Very good
B -	Good
C -	Satisfactory
D -	Fair
E -	Unsatisfactory (Fail)

(e) The class teacher should be required to enter the "grades" in a special register against each child. At the end of the month/term these grades may be converted into points:

Standard	*Grade*
Very Good	A
Good	B
Satisfactory	C
Fair	D
Unsatisfactory (Fail)	E

5. Submission of SUPW and Community Service Grades

The Head of the School will be responsible for the correct entry of the result of each candidate in terms of grades A, B, C, D or E based on the following scale and standard:

Grade	*Standard*
A	Very Good
B	Good
C	Satisfactory
D	Fair
E	Unsatisfactory (Fail)

The grade of each candidate in Socially Useful Productive Work and Community Service for Class X, is to be submitted online through CISCE's CAREERS portal by the due date.

CONTEMPORARY STUDIES (OPTIONAL)

(Recommended to form a component of SUPW)

The aim of the section on **Contemporary Studies** is to provide to all students a comprehensive appreciation of the contemporary world and society and enable them to:

(i) Understand modern development.

(ii) Acquire skills that are necessary to withstand the interrelationships in society, politics and natural environment.

(iii) Appreciate the constraints and opportunities that enable a social order to evolve.

(iv) Participate in meaningful, interactive exposure to programmes that provide sensitization to poverty, exploitation and injustice.

Note: *Pupils are to be provided a general appreciation of the following topics with a view to cultivate and inculcate values promoting sustainable societal practices.*

CLASS IX

1. Environment

Civic Sense, Health and Hygiene

- *Types of pollution and effective measures for prevention of pollution.*
- *Conservation of natural resources.*
- *Waste products management.*
- *Respect for laws regulating community living.*
- *Respect for other's freedom.*
- *Concern for public property.*
- *Need for inculcating hygienic habits.*
- *Importance of vaccination.*

2. Population Education

Family planning, small family norms, gender equality. Female infanticide, abortion laws/ euthanasia.

3. The cultivation of Aesthetics

- *Appreciation of art, music, poetry, literature and drama.*
- *Cultivation of soft sensibilities and promotion of values that enhance appreciation of new living practices.*

4. Quality of Life

- *Importance of effective use of time; hobbies, interests and importance of group activities.*
- *Doing the right things and doing things right.*
- *Cultivation of attitudes that enhance sustainable living practices.*
- *Striving to achieve excellence.*

5. Culture, 'Sanskars' and Values

- *Tenets of important religions in India supporting the cultivation of values and sustainable living practice (Two stories/parables each of the holy books).*
- *Role of caste and religion in politics with reference to India, Japan and US.*
- *Prejudice and Stereotyping - stereotyping mechanism, ways to overcome stereotyping.*

6. The Role of Family

- *Definition of family.*

  Classification of family: nuclear, extended and joint.

- *Changing family values.*

  Collective impact of values acquired in the family on society.

CLASS X

1. Consolidating Nationhood

- *Appreciation of the Fundamental Duties and Rights as provided in the Constitution.*
- *Citizen's role in nation building.*
- *Role of taxes - direct and indirect.*
- *Concerns related to lack of participation in the national processes such as elections*
- *Awareness of consumer rights in order to avoid exploitation.*

2. The Role of Media

- *Press, film and television.*
- *Media as a vehicle of social change.*
- *Impact of media on young people.*
- *Press reporting: biases & censorship.*
- *Feasibility of restrictions.*
- *Sensationalisation of news, exploitative practices.*
- *Press Council – its structure and role.*

3. Cultural Diversity - India

- *Study of some major tribes of India and a broad understanding of their social beliefs and practices.*
- *The need for sustaining cultural diversity.*

4. India and the world

- *India's positioning with respect to other countries.*
- *Partnerships between the countries of Asia and the Pacific and their influences on India and its people.*

5. Globalisation

- *Understanding of globalization as a worldwide aspiration linking humane values.*
- *Modernism and Internationalism.*
- *Global Broadcasting and journalism, role of news agencies, effects of the global reach of broadcasting, risk to cultural values due to bombardment by foreign-based media.*

6. Concerns today

- *Nuclear disarmament – CTBT.*
- *Human rights, Gia hypothesis, Malthus and Darwinism.*
- *Advantages and disadvantages to the consumer of a competitive market.*
- *Dehumanization due to technological advances.*
- *Advertising and its impact.*
- *Impact of society moving towards 'quick fix' solutions leading to corrupt practices.*
- *Underemployment and Unemployment.*
- *The ethical and moral impact of the Internet.*