

# ECONOMIC APPLICATIONS (87)

## CLASS X

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

*The paper will consist of Part I and Part II.*

**Part I (compulsory)** will contain short answer questions on the entire syllabus.

**Part II** will consist of questions that will require detailed answers. There will be a choice of questions.

### THEORY – 100 Marks

#### 1. Demand and Supply: Basic Concepts

- (i) Demand and Supply; Law of demand and supply, demand and supply schedule and curve (both individual and market); movement and shift of the demand and supply curve; determinants of demand and supply; exceptions to the law of demand.

*Meaning of Demand and Supply.*

*A basic understanding of the law of demand and supply in which demand and supply schedules are to be used to explain the demand and supply curves. The individual demand and supply curves must be distinguished from market demand and supply curves. Determinants of demand and supply are to be specified. Exceptions to the law of demand are to be discussed.*

- (ii) Elasticity of demand and elasticity of supply  
Meaning and types.

*Self-explanatory*

#### 2. Factors of Production: Basic Concepts

Factors of production- Land, Labour, Capital and Entrepreneur.

*Land- meaning and characteristics, functions and its importance, factors affecting productivity of land.*

*Labour- meaning and characteristics. Division of labour - meaning, Efficiency of labour- meaning, reasons for low efficiency of Indian labour.*

*Capital - meaning, types and characteristics. Capital formation – meaning.*

*Entrepreneur - meaning, functions and role of entrepreneurs in economic development.*

#### 3. Alternative Market Structures: Basic Concepts

Nature and structure of markets- Perfectly competitive market, Monopoly market, monopolistically competitive market, concept of product differentiation, Monopsony market.

*The main features of the following market structures are to be discussed in the context of present business scenario–*

*Perfectly competitive market, Monopoly market, monopolistically competitive market,*

*Monopsony market (meaning to be highlighted).*

#### 4. The State and Economic Development

The instruments of State intervention- fiscal policy and monetary policy; The Public sector enterprises - their role and problems.

*The meaning of fiscal policy. Direct and Indirect Taxes (meaning, merits and demerits), Types of Taxes (progressive, regressive, proportional and degressive- meaning with examples). Monetary Policy – meaning only. Public sector - its role and problems.*

## 5. Money and Banking: Basic Concepts

Money: meaning; Inflation - meaning, effects of inflation on the functioning of the economy (in brief). Banking: Commercial Banks - functions; Central Bank - functions; quantitative and qualitative credit control measures adopted by RBI.

*A basic understanding of the concepts of money, Meaning and types of inflation to be discussed (Creeping, Walking, Running and Hyper-inflation). The impact of inflation on various economic entities such as debtors and creditors, fixed income groups and producers are to be explained very briefly. Functions of commercial Banks: Acceptance of deposit and lending (types of loans and deposits must be taught) and functions of RBI-Monopoly of note issue. Qualitative and quantitative controls used by the RBI- the meaning and difference between the two. The tools of the qualitative and quantitative control should be named.*

**NOTE:** IT IS SUGGESTED THAT CASE STUDIES MAY BE DISCUSSED ON THE FOLLOWING TOPICS:

- Factors of Production
- Banking
- Inflation

### INTERNAL ASSESSMENT – 100 Marks

Candidates will be required to do a minimum of **four** assignments during the year, as assigned by the teacher.

#### Suggested list of assignments:

1. Take a fast moving consumer good (FMCG) like washing machine detergent. Analyze the factors that determine the demand of this product. Present your findings in form of a class presentation.
2. Develop a hypothetical table of information for coffee that shows quantity demanded at various prices and supply of coffee at these prices. Draw a demand curve and supply curve and show an equilibrium price at which market is cleared of its supplies.

3. Make a list of products for which you think demand is price inelastic and price elastic. Specify the reasons you may think relevant for your analysis.
4. Take a case of a nationalized bank – visit any one of its branches in your city. Analyze the main functions of this bank’s branch. Make a presentation to this effect.
5. Recently rates of interests have been reduced on all the saving instruments. Carry out a survey of 30 people in your area as to what is their reaction to this cut. The sample may consist of salaried people, business people and professionals.
6. Take a case of five FMCGs – fast moving consumer goods - bathing soaps, toothpastes, facial creams, shampoos, ball pens. Analyze as to how the market for these products is characterized by product differentiation.
7. Take the case of a company and analyze the production process in which all the factors that you studied in your class, are used by the company to produce a product.

## EVALUATION

The project work is to be evaluated by the subject teacher and by an External Examiner. The 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 Economics of Class XI may be deputed to be the External Examiner for Class X Economic Applications project work.

The Internal Examiner and the External Examiner will assess the candidate’s work independently.

Award of marks	(100 marks)
Subject Teacher (Internal Examiner):	50 marks
External Examiner :	50 marks

The total marks obtained out of 100 are to be sent to the Council by the Head of the School. The Head of the school will be responsible for the online entry of marks on the Council’s CAREERS portal by the due date.

### INTERNAL ASSESSMENT IN ECONOMIC APPLICATIONS - PROPOSED GUIDELINES FOR MARKING WITH GRADES

Criteria	Preparation	Procedure	Observation	Inference	Presentation	Marks
Grade I	Excellent choice of firm, appropriate to project; clear identification of aspect to study; good research.	Originality and relevance; creative, rational and structured thinking; effective model; good questionnaire.	Systematic record of data; good arrangement of data; independent market survey; creative representation.	Information fitted correctly to model; work indicates understanding, good comprehension of subject.	Methodical, precise and clear expression; neat and tidy presentation; optimum utilisation of skills.	4 marks for each criterion
Grade II	Relevant choice of firm; identified aspect to study; adequate research.	Originality and structured thinking; adequate framing of questions; good insight.	Able to record data, but not step-by-step; able to grasp information; independent market survey.	Can judge and grasp information correctly; conclusion quantitatively evaluated.	Work neat and tidy and clearly presented; methodical and appropriate techniques used.	3 marks for each criterion
Grade III	Adequate choice of firm; some idea of what to study; some information gathered.	Records information correctly but lacks originality; independent framing of questions.	Assistance required in presenting, recording and arranging data; can conduct market survey.	Requires some assistance to relate data to model; able to relate to economic scenario.	Reasonably clear but work disorganised in places; writing untidy in places.	2 marks for each criterion
Grade IV	Firm selected but continuous assistance required for collection of information.	Unable to form a correct model; requires assistance to prepare questionnaire.	Tends to make mistakes in organising data; some ability to conduct market survey.	Assistance required in order to grasp the relevant and validity of information; tends to make errors.	Sequence of work acceptable but not very neat; poor presentation.	1 mark for each criterion
Grade V	Lack of perception of the subject and objective; lack of effort.	Not able to comprehend concept of a model; unable to prepare questionnaire even with assistance.	Faulty survey and mistakes in data; not able to proceed even with assistance.	Cannot process results; faulty conclusions in spite of assistance provided.	Data presentation untidy and disorganised; effort and initiative lacking.	0 marks for each criterion

# ENGLISH (01)

## CLASS X

There will be **two** papers:

*Paper 1: English Language;*

*Paper 2: Literature in English.*

Each of these papers will be of **two hours** duration.

**Paper 1:** English Language (80 Marks)  
Internal Assessment (20 Marks)

**Paper 2:** Literature in English (80 Marks)  
Internal Assessment (20 Marks)

### PAPER 1 - ENGLISH LANGUAGE

(Two hours) - 80 Marks

Five questions will be set, all of which 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 subjects will be varied and may be suggested by language or by other stimuli such as pictures. The subjects will be so chosen so as to allow the candidates to draw on first-hand experience or to stimulate their imagination.

With one subject, a number of suggestions about the content of the composition will be given, but the use of the suggestions will be optional and a candidate will be free to treat the subject in any way that he/she chooses.

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 an informal mode of treatment. Suggestions regarding the content of the letter may be given. The layout 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 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 **450** words will be given. Uncommon items of vocabulary, or structure will be avoided. One 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 clear indications 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 use of the language.

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

## PAPER 2 - LITERATURE IN ENGLISH

(Two hours) - 80 Marks

Candidates will be required to answer five questions from 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 give their interpretation of the questions set, which should be in their own words and relevant to the text.

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

### **Poetry**

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

### **Syllabus to be covered in Class X for the ICSE Examination - Literature in English (English Paper – 2)\***

#### **1. THE MERCHANT OF VENICE** (Shakespeare's **unabridged** play by A.W. Verity - Complete Play)

**TREASURE TROVE - A collection of ICSE Poems and Short Stories** (Evergreen Publications)

#### **2. POETRY: All poems to be studied.**

- (i) *The Heart of the Tree* – Henry Cuyler Bunner
- (ii) *The Cold Within* – James Patrick Kinney
- (iii) *The Bangle Sellers* – Sarojini Naidu
- (iv) *After Blenheim* – Robert Southey
- (v) *Television* – Roald Dahl
- (vi) *Daffodils* – William Wordsworth
- (vii) *The Patriot* – Robert Browning
- (viii) *Abu Ben Adhem* – Leigh Hunt
- (ix) *Nine Gold Medals* – David Roth

#### **3. PROSE (short stories): All short stories to be studied.**

- (i) *Chief Seattle's Speech*
- (ii) *Old Man at the Bridge* – Ernest Miller Hemingway
- (iii) *A Horse and Two Goats* – R.K. Narayan
- (iv) *Hearts and Hands* – O. Henry

- (v) *A Face in the Dark* – Ruskin Bond
- (vi) *An Angel in Disguise* – T.S. Arthur
- (vii) *The Little Match Girl* – Hans Christian Andersen
- (viii) *My Greatest Olympic Prize* – Jesse Owens
- (ix) *All Summer in a Day* – Ray Douglas Bradbury

**\* Please note that the Class X - ICSE Examination paper will be set on the entire syllabus prescribed for the subject.**

**Note:** For list of prescribed text-books see Appendix- I.

## INTERNAL ASSESSMENT

### **Paper 1 - English Language**

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

**Two assessments to be done 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).

<b>Award of Marks</b>	<b>(20 Marks)</b>
Listening Skills:	10 marks
Speaking Skills:	10 marks

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

The Head of the School will be responsible for the online entry of marks on the Council's CAREERS portal by the due date. Schools are required to maintain a record of all assessments conducted in **Listening and Speaking Skills**. 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:

*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.

### 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.

<b>Award of Marks</b>	<b>(20 Marks)</b>
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

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

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

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

<b>Grade</b>	<b>Understanding/ Comprehension Main Idea, Central Theme</b>	<b>Recall</b>	<b>Vocabulary</b>	<b>Context/ Correlation to Other Areas</b>	<b>Marks</b>
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)**

<b>Grade</b>	<b>Fluency of Language</b>	<b>Subject Matter</b>	<b>Organization</b>	<b>Vocabulary/ Delivery</b>	<b>Understanding</b>	<b>Gesture</b>	<b>Marks</b>
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)**

<b>Grade</b>	<b>Understanding of Text (Narrative)</b>	<b>Examples from Text</b>	<b>Understanding of text- Interpretation and Evaluation</b>	<b>Appreciation of Language, Characterization</b>	<b>Critical Appreciation - Personal Response</b>	<b>Marks</b>
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

# HISTORY, CIVICS AND GEOGRAPHY (50)

## GEOGRAPHY

### H.C.G. - Paper - 2

#### CLASS X

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

The Paper will consist of **two** parts, Part I and Part II.

**Part I** (compulsory) will consist of **two** questions. Question 1 will be based on **Topographical Map**. Question 2 will be based on outline **Map of India**.

**Part II:** Candidates will be expected to answer any **five** questions.

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

- Locating features with the help of a four figure or a six-figure grid reference.
- Definition of contour and contour interval. Identification of landforms marked by contours (steep slope, gentle slope, hill), triangulated height, spot height, bench mark, relative height/depth.
- Interpretation of colour tints used on a topographical survey of India map.
- Identification and definition of types of scale given on the map.  
*Measuring distances and calculating area using the scale given therein.*
- Marking directions between different locations, using eight cardinal points.
- 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, Vindhya, Satpura, Western and Eastern Ghats, Nilgiris, Mount Godwin Austin (K2). 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, Jhelum, Satluj, Ganga, Yamuna, Ghaghra, Gomti, 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, Chilka Lake, Wular Lake.

**Passes:** Karakoram Pass.

**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.

**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 (Rainwater 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, (distribution, advantages and disadvantages).*
- *Non-conventional Sources: Solar, wind, nuclear and bio-gas (generation and advantages).*

#### 9. Agriculture

- *Indian Agriculture – importance, problems and reforms.*
- *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)*
- *Mineral based Industry – Iron & Steel (TISCO, 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.

<b>Award of Marks</b>	<b>(20 Marks)</b>
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

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

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

**INTERNAL ASSESSMENT IN GEOGRAPHY - GUIDELINES FOR MARKING WITH GRADES**

<b>Criteria</b>	<b>Preparation</b>	<b>Procedure/ Testing</b>	<b>Observation</b>	<b>Inference/Results</b>	<b>Presentation</b>
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.

# HISTORY, CIVICS AND GEOGRAPHY (50)

## HISTORY AND CIVICS

### H.C.G. - Paper - 1

#### CLASS X

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

The paper will be divided into **two** parts, Part I and Part II.

**Part I** (30 marks) will contain short answer questions set from the entire syllabus.

Candidates will be required to answer **all** questions.

**Part II** (50marks) will consist of Section A and Section B. Candidates will be required to answer **two** out of **three** questions from Section A and **three** out of **five** questions from Section B. The sections will correspond to the sections indicated in the syllabus.

#### 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.

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

*Powers and functions of Union Parliament (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, discretionary and emergency).*

(b) Prime Minister and Council of Ministers.

*Appointment, formation of Council of Ministers, tenure; 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; 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.*

(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) 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.

*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. 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: objectives of the Muslim League.*

## 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, 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  
*The 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, division of Europe and Sarajevo crisis) and Results (Treaty of Versailles).*

- (b) The Second World War

*Causes (Dissatisfaction with the Treaty of Versailles, Rise of Fascism and Nazism, Japanese invasion of China, Failure of League of Nations and Hitler's invasion of Poland).*

- (c) United Nations

- (i) The objectives of the U.N.

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

- (ii) Major agencies of the United Nations: UNICEF, WHO and UNESCO - *any four functions for each.*

- (d) Non-Aligned Movement.

*Brief meaning; Panchsheel; 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 20<sup>th</sup> 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 power point 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.

## **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 the Council by the Head of the School.

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



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

<b>Grade</b>	<b>Preparation/ Research</b>	<b>Information</b>	<b>Concepts</b>	<b>Thinking Skills</b>	<b>Presentation</b>	<b>Marks</b>
I	<ul style="list-style-type: none"> <li>▪ Follows instructions with understanding.</li> <li>▪ Masters research techniques easily.</li> <li>▪ Reference work is orderly.</li> </ul>	<ul style="list-style-type: none"> <li>▪ A good deal of relevant matter.</li> <li>▪ Uses wide range of sources.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Good understanding of historical concepts - sequence/ reconstruction- causes and consequences-continuity and change</li> <li>▪ Empathy.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Different interpretations of evidence.</li> <li>▪ Can draw Inferences/ deductions/ conclusions.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Matter presented is clear and is in coherent form (sub-headings, sections, chapters etc.)</li> <li>▪ Work is neat and tidy and not over elaborate.</li> </ul>	4
II	<ul style="list-style-type: none"> <li>▪ Follows instructions but needs a little help in research techniques.</li> <li>▪ Reference notes quite orderly.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Selects matter relevant to context.</li> <li>▪ Limited use of references/ sources.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Understanding of concepts is adequate.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Limited / Single interpretation of evidence with some examples.</li> <li>▪ Some inferences/ conclusions are drawn.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Matter is presented in coherent form but not organized into sections etc.</li> <li>▪ Presentation neat and tidy but not elaborate.</li> </ul>	3
III	<ul style="list-style-type: none"> <li>▪ Follows instructions but needs constant guidance.</li> <li>▪ Reference notes at times disorderly.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Relevant matter but limited reference work.</li> <li>▪ Matter is sketchy.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Displays limited use of concepts.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Few examples /single example to support reasoning.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Work is presented in an orderly way, but not organized into sections.</li> <li>▪ Over use of ‘cosmetics’ to hide lack of substance.</li> <li>▪ Work is quite neatly presented.</li> </ul>	2
IV	<ul style="list-style-type: none"> <li>▪ Struggles with research methods and needs constant guidance.</li> <li>▪ Reference notes copied without reference to keywords.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hardly any reference material.</li> <li>▪ Use of irrelevant matter.</li> <li>▪ Matter is sketchy.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Minimal competency in concepts.</li> <li>▪ A few of the required concepts.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Finds it difficult to make conclusions/ deductions/ inferences.</li> <li>▪ No examples to support reasoning.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Matter presented in a confused way at times (no sub-headings, chapters, etc.)</li> <li>▪ Tendency to copy from reference books.</li> <li>▪ Use of “cosmetics” to hide lack of substance.</li> </ul>	1
V	<ul style="list-style-type: none"> <li>▪ Cannot follow instructions.</li> <li>▪ Works ‘blindly’ without reference to keywords.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No reference work/copied from other textbooks/ sketchy matter.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Unable to demonstrate concepts.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Unable to make inferences/ deductions or come to any conclusions.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Matter presented in an incoherent/ disorganized way.</li> <li>▪ Copied from textbooks “blindly”.</li> <li>▪ Use of “cosmetics” to hide lack of substance.</li> <li>▪ Untidy work.</li> </ul>	0

**SCIENCE (52)**  
**PHYSICS**  
**SCIENCE Paper - 1**  
**CLASS X**

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

*The paper will be divided into **two** sections, Section I (40 marks) and Section II (40 marks).*

***Section I** (compulsory) will contain short answer questions on the entire syllabus.*

***Section II** will contain six questions. Candidates will be required to answer any **four** of these **six** questions.*

***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  $\theta = 0^\circ, 90^\circ$ .  $W = mgh$ . 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 horse power ( $1hp=746W$ ) [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 ( $\eta$ ), relation between  $\eta$  and  $MA$ ,  $VR$  (derivation included); for all practical machines  $\eta < 1$ ;  $MA < VR$ .*

*Pulley system: single fixed, single movable, block and tackle (using single tackle).;  $MA$ ,  $VR$  and  $\eta$  in each case.*

- (vi) Principle of Conservation of energy.

*Statement of the principle of conservation of energy; theoretical verification that  $U + K = \text{constant}$  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 ( $\lambda$ ) 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  $\mu = c/V$ ,  $V = f\lambda$ . Values of  $\mu$  for common substances such as water, glass and diamond; experimental verification; refraction through glass block; lateral displacement; 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 ( $C$ )  $\mu = 1/\sin C$ . Essential conditions for total internal reflection. Total internal reflection in a triangular glass prism; ray diagram, different cases - angles of prism ( $60^\circ, 60^\circ, 60^\circ$ ), ( $60^\circ, 30^\circ, 90^\circ$ ), ( $45^\circ, 45^\circ, 90^\circ$ ); use of right angle prism to obtain  $\delta = 90^\circ$  and  $180^\circ$  (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); Only definition and basic understanding based on the curvature or thickness of lens. Applications of lenses.*

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

*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.*

## 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.

*Meaning of the terms and the factors affecting them (no 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; 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. Simple numerical problems using the above relations. [Simple network of resistors involving not more than four external resistors in a circuit.].

(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  $W = VI = I^2 Rt = (V^2/R)t$  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  $\times$  hour = kWh), (simple numerical problems).

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

Main circuit (3 wires-live, neutral, earth) with fuse / MCB, main switch and its advantages, 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).

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; conductor carrying current in a magnetic field experiences a force, Fleming's Left Hand Rule, brief description and type of energy transfer in DC motor (detailed working not required): Simple introduction to electromagnetic induction; frequency of AC in house hold supplies, Fleming's Right Hand Rule (with its application in understanding the direction of current in a coil and Lenz's law), brief description and

type of energy transfer in AC generator (detailed working not required). Advantage of AC over DC.

## 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 ( $^{\circ}C$ , 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

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.  $\alpha$ ,  $\beta$  and  $\gamma$  - their nature and properties; changes within the nucleus. One example each of  $\alpha$  and  $\beta$  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.

## A NOTE ON SI UNITS

SI units (*Système International d'Unités*) 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 <sup>3</sup>
Density	kilogram per cubic metre	kg m <sup>-3</sup>
Velocity	metre per second	m s <sup>-1</sup>
Acceleration	metre per second squared	m s <sup>-2</sup>
Momentum	kilogram metre per second	kg m s <sup>-1</sup>

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 <sup>9</sup>	giga	G
10 <sup>6</sup>	mega	M
10 <sup>3</sup>	kilo	k
10 <sup>-1</sup>	deci	d
10 <sup>-2</sup>	centi	c
10 <sup>-3</sup>	milli	m
10 <sup>-6</sup>	micro	μ
10 <sup>-9</sup>	nano	n
10 <sup>-12</sup>	pico	p
10 <sup>-15</sup>	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  $VR = \text{effort arm/load arm}$ . 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  $\delta$ . Repeat for four different angles of incidence (say  $i_1=40^\circ$ ,  $50^\circ$ ,  $60^\circ$  and  $70^\circ$ ). 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  $\delta$ . Explain briefly. Do this for prisms with  $A=60^\circ$ ,  $45^\circ$  and  $90^\circ$ .
8. Calculate the sp. heat 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 sp. heat of a metal by method of mixtures.
10. Determination of specific latent heat of ice.
11. Using a 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 5 to 7 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 the Council by the Head of the school.

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

# SCIENCE (52)

## BIOLOGY

### SCIENCE Paper - 3

#### CLASS X

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

The paper will be divided into **two** sections, Section I (40 marks) and Section II (40 marks).

**Section I (compulsory)** will contain short answer questions on the entire syllabus.

**Section II** will contain **six** questions. Candidates will be required to answer any **four** of these **six** questions.

#### 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 chromatid, 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<sub>2</sub>, formation of ATP (photophosphorylation) and NADPH.*
- *Dark reaction - only combination of hydrogen released by NADP with CO<sub>2</sub> 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".*

### 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.*
- *Methods of population control: Surgical methods – Tubectomy and vasectomy.*

### **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**

- Observation of permanent slides of stages of mitosis.
- 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<sub>2</sub> 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 the Council by the Head of the school.

The Head of the school will be responsible for the online entry of marks on the Council'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.

**SCIENCE (52)**  
**CHEMISTRY**  
**SCIENCE Paper - 2**  
**CLASS X**

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

*The paper will be divided into two sections, Section I (40 marks) and Section II (40 marks).*

*Section I (compulsory) will contain short answer questions on the entire syllabus.*

*Section II will contain six questions. Candidates will be required to answer any four of these six questions.*

*Note: All chemical process/reactions should be studied with reference to the reactants, products, conditions, observation, 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<sub>2</sub>, 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<sub>2</sub>O 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<sub>3</sub>O<sup>+</sup> and OH<sup>-</sup> ions in water and NH<sub>4</sub><sup>+</sup> ion.*

*The meaning of lone pair; the formation of hydronium ion and ammonium ion must be explained with 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).*

#### 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

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:*
  - the percentage composition of a compound.*
  - the masses of combining elements.*

#### 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 aluminium.*

(ii) 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.***

(iii) 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 learnt.*
- *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 alkalis.*

***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 (Chlorofluoro 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<sub>2</sub>, Br<sub>2</sub> and I<sub>2</sub> pertaining to alkenes and alkynes.*

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

### 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 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<sup>2+</sup>, Cu<sup>2+</sup>, Fe<sup>2+</sup>, Fe<sup>3+</sup>, Pb<sup>2+</sup>, Zn<sup>2+</sup>, NH<sub>4</sub><sup>+</sup>.
3. Supply a solution of a dilute acid and alkali. Determine which is acidic and which is basic, giving two tests for each.

### 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 the Council by the Head of the school.

The Head of the school will be responsible for the online entry of marks on the Council'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



# COMPUTER APPLICATIONS (86)

## CLASS X

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

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

**Section A** (Compulsory – 40 marks) will consist of compulsory short answer questions covering the entire syllabus.

**Section B** (60 marks) will consist of questions which will require detailed answers. There will be a choice of questions in this section

### 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. Arrays

Definition of an array, types of arrays, declaration, initialization and accepting data of single dimensional array, accessing the elements of single dimensional array.

*Arrays and their uses, sorting technique - bubble sort; Search technique – linear search, Array as a composite type, length statement to find the size of the array (sorting and searching techniques using single dimensional array only).*

## 7. 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.*

## 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 **15** 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) 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.
- (v) 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, piglatin, 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 the Council by the Head of the school.

The Head of the school will be responsible for the online entry of marks on the Council'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.*

# MATHEMATICS (51)

## CLASS X

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

The paper will be divided into **two** sections, Section I (40 marks), Section II (40 marks).

**Section I:** Will consist of compulsory short answer questions.

**Section II:** Candidates will be required to answer **four** out of **seven** questions.

### 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:

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

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

### 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

2

- 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.

#### (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 $2 \times 2$ matrices.

##### (e) Multiplication of a $2 \times 2$ matrix by

- a non-zero rational number
- a matrix.

(vi) Arithmetic Progression

- Finding their General term.
- Finding Sum of their first ‘n’ terms.

(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  $\theta$  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) Comparison with congruency, keyword being proportionality.

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

(iii) Applications of Basic Proportionality Theorem.

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

(b) 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.
- From any point outside a circle, two tangents can be drawn, and they are equal in length.
- 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

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

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

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

$$= \sec^2 A$$

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

(c) *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:

$$\text{Direct} \quad : \quad \frac{\sum fx}{\sum f}$$

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

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

(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

**Note: 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**

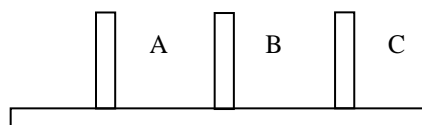
<b>In general</b>			
Implies that	$\Rightarrow$	is logically equivalent to	$\Leftrightarrow$
Identically equal to	$\equiv$	is approximately equal to	$\gg$
<b>In set language</b>			
Belongs to	$\in$	does not belong to	$\notin$
is equivalent to	$\leftrightarrow$	is not equivalent to	$\nleftrightarrow$
union	$\cup$	intersection	$\cap$
universal set	$\xi$	is contained in	$\subset$
natural (counting) numbers	N	the empty set	$\emptyset$
whole numbers		whole numbers	W
integers	Z	real numbers	R
<b>In measures</b>			
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.

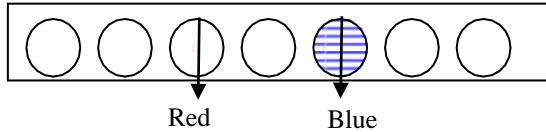
**Suggested Assignments**

- 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 ( $n = 1, 2, 3, \text{etc.}$ ) 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 the Council by the Head of the school.

The Head of the school will be responsible for the online entry of marks on the Council'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

# 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, Khasi, Lepcha, Malayalam, Manipuri, Marathi, Mizo, Nepali, Odia, Punjabi, Sanskrit, Tamil, Tangkhul, Telugu, Urdu or any other language of an Indian community approved by the Council.

*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)*

*Candidates will be required to attempt **all** questions from Section A. They must attempt **four** questions from Section B from **ONLY two** of the prescribed textbooks.*

### SECTION A: LANGUAGE - 40 Marks

This section will consist of four questions, all of which 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. (15 Marks)

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. (7 Marks)
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. (10 Marks)
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. (8 Marks)

### SECTION B: PRESCRIBED TEXTS - 40 Marks

The question paper will consist of structured and short answer questions. Candidates will be required to answer four questions from **ONLY two** of the prescribed text books. 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. **The Council 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 the Council by the Head of the school.

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

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

<b>Grade</b>	<b>Content/Analysis of Idea, Thought/ Feeling.</b>	<b>Expression/ Effective Expression of Idea</b>	<b>Structure/ Organisation of Material</b>	<b>Vocabulary/ Use of Words, Phrases</b>	<b>Originality/ Imaginative/ Innovative</b>	<b>Marks</b>
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 express 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)**

<b>Grade</b>	<b>Understanding/ Comprehension Main Idea, Central Theme</b>	<b>Recall</b>	<b>Vocabulary</b>	<b>Context/ Correlation to Other Areas</b>	<b>Marks</b>
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)**

<b>Grade</b>	<b>Fluency of Language</b>	<b>Subject Matter</b>	<b>Organization</b>	<b>Vocabulary/ Delivery</b>	<b>Understanding</b>	<b>Gesture</b>	<b>Marks</b>
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)**

<b>Grade</b>	<b>Understanding of Text (Narrative)</b>	<b>Examples from Text</b>	<b>Understanding of text- Interpretation and Evaluation</b>	<b>Appreciation of Language, Characterization</b>	<b>Critical Appreciation -Personal Response</b>	<b>Marks</b>
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