Series Z1XYW/6

SET ~ 2

प्रश्न–पत्र कोड
Q.P. Code **31/6/2**

रोल नं.
Roll No.

परीक्षार्थी प्रश्न–पत्र कोड को उत्तर–पुस्तिका के मुख–पृष्ठ पर अवश्य लिखें ।
Candidates must write the Q.P. Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न–पत्र में मुद्रित पृष्ठ **31** हैं ।
- प्रश्न–पत्र में दाहिने हाथ की ओर दिए गए प्रश्न–पत्र कोड को परीक्षार्थी उत्तर–पुस्तिका के मुख–पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न–पत्र में **39** प्रश्न हैं ।
- **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर–पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**
- इस प्रश्न–पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न–पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक परीक्षार्थी केवल प्रश्न–पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर–पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।

- Please check that this question paper contains **31** printed pages.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **39** questions.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

विज्ञान

SCIENCE

निर्धारित समय : **3** घण्टे
Time allowed : **3** hours

अधिकतम अंक : **80**
Maximum Marks : **80**

General Instructions :

Read the following instructions carefully and strictly follow them :

(i) *This question paper contains **39** questions. **All** questions are compulsory.*

(ii) *Question paper is divided into **FIVE** sections viz. Section **A, B, C, D** and **E.***

(iii) *In section **A** - question number **1** to **20** are Multiple Choice Questions (MCQs) carrying **1** mark each.*

(iv) *In section **B** - question number **21** to **26** are Very Short Answer (VSA) type questions carrying **2** marks each. Answer to these questions should be in the range of **30** to **50** words.*

(v) *In section **C** - question number **27** to **33** are Short Answer (SA) type questions carrying **3** marks each. Answer to these questions should be in the range of **50** to **80** words.*

(vi) *In section **D** - question number **34** to **36** are Long Answer (LA) type questions carrying **5** marks each. Answer to these questions should be in the range of **80** to **120** words.*

(vii) *In section **E** - question number **37** to **39** are of 3 source-based/case-based units of assessment carrying **4** marks each with sub-parts.*

(viii) *There is no overall choice. However, an internal choice has been provided in some Sections.*

SECTION – A

Select and write **one** most appropriate option out of the four options given for each of the questions **1 – 20**.

1. To balance the following chemical equation the values of x and y should respectively be : **1**

$$2NaOH + xAl_2O_3 \longrightarrow yNaAlO_2 + H_2O$$

(a) 1, 4 (b) 1, 2

(c) 2, 4 (d) 2, 3

2. A solution turns the colour of turmeric to reddish brown. If the same solution is poured on universal indictor, its colour would change to – **1**

(a) violet (b) blue

(c) red (d) green

3. The magnetic field inside a long straight current carrying solenoid : **1**

(a) is zero.

(b) decreases as we move towards its end.

(c) increases as we move towards its end.

(d) is same at all points.

4. Bronze is an alloy of **1**

(a) Copper and Zinc (b) Aluminium and Tin

(c) Copper, Tin and Zinc (d) Copper and Tin

5. Given below are two columns, Column I shows enzymes secreted by the glands in the alimentary canal of human beings and Column II indicates the components of food on which enzymes act. Choose the options showing correct matching : **1**

	Column I (Enzymes)	**Column II (Component)**
(a)	Pepsin	Starch
(b)	Trypsin	Proteins
(c)	Lipase	Proteins
(d)	Amylase	Emulsified fat

6. Metal oxides generally react with acids, but few oxides of metal also react with bases. Such metallic oxides are : **1**

I. MgO

II. ZnO

III. Al_2O_3

IV. CaO

(a) I and II (b) II and III

(c) III and IV (d) I and IV

7. To obtain a magnification of + 2 with a concave mirror of radius of curvature 60 cm the object distance must be **1**

(a) – 90 cm (b) – 45 cm

(c) – 30 cm (d) – 15 cm

8. Consider the following chemical equation I and II **1**

I. $Mg + 2HCl \longrightarrow MgCl_2 + H_2$

II. $NaOH + HCl \longrightarrow NaCl + H_2O$

The correct statement about these equations is –

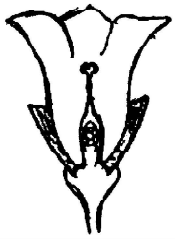
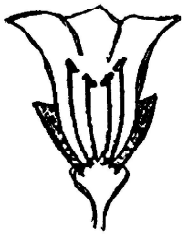
(a) 'I' is a displacement reaction and 'II' is a decomposition reaction.

(b) 'I' is a displacement reaction and 'II' is double displacement reaction.

(c) Both 'I' and 'II' are displacement reactions.

(d) Both 'I' and 'II' are double-displacement reactions.

9. Consider the following three flowers namely X, Y and Z. Which flower(s) would develop into a fruit ? **1**

Flower X	Flower Y	Flower Z
		

(a) 'X' only (b) 'Z' only

(c) 'X' and 'Y' only (d) 'Y' and 'Z'

10. Two salts 'X' and 'Y' are dissolved in water separately. When phenolphthalein is added to these two solutions, the solution 'X' turns pink and the solution 'Y' does not show any change in colour, therefore 'X' and 'Y' are **1**

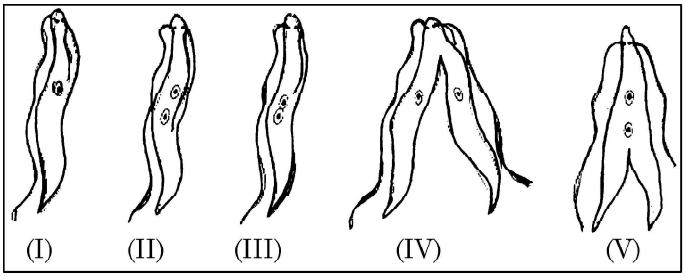
	(X)	(Y)
(a)	Na_2CO_3	NH_4Cl
(b)	Na_2SO_4	$NaHCO_3$
(c)	NH_4Cl	Na_2SO_4
(d)	$NaNO_3$	Na_2SO_4

11. In human eye the part which allows light to enter into the eye is – **1**

(a) Retina (b) Pupil

(c) Eye lens (d) Cornea

12. Choose the correct order of the stages of binary fission in Leishmania. **1**



(a) I, II, III, IV, V (b) I, III, II, V, IV

(c) I, III, V, II, IV (d) I, II, III, V, IV

13. The phenomena of light involved in the formation of rainbow are **1**

(a) Refraction, dispersion and scattering.

(b) Refraction, reflection and dispersion.

(c) Refraction, dispersion and internal reflection.

(d) Reflection, dispersion and total internal reflection.

14. In an experiment with pea plants, a pure tall plant (TT) is crossed with a pure short plant (tt). The ratio of pure tall plant to pure short plants in F_2 generation will be **1**

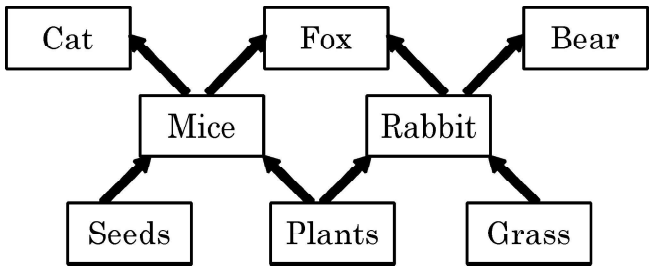
(a) 1 : 3 (b) 3 : 1

(c) 1 : 1 (d) 2 : 1

15. Walking in a straight line and riding a bicycle are the activities which are possible due to a part of the brain. Choose the correct location and name of this part from the given table : **1**

	Part of the Brain	**Name**
(a)	Fore brain	Cerebrum
(b)	Mid brain	Hypothalamus
(c)	Hind brain	Cerebellum
(d)	Hind brain	Medulla

16. Study the given figure of a Food web and identify the primary consumer in the food web: **1**



(a) Mice and Bear
(b) Rabbit and Cat
(c) Rabbit and Fox
(d) Mice and Rabbit

Q. No. 17 to **20** are Assertion – Reasoning based questions.

These consists of two statements –

Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A).

(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

17. **Assertion (A) :** Melting point and boiling point of ethanol are lower than that of sodium chloride. **1**

Reason (R) : The forces of attraction between the molecules of ionic compoünds are very strong.

18. **Assertion (A) :** An ecosystem consists of biotic components and abiotic components. **1**

Reason (R) : Biotic and abiotic components play important roles for the sustenance of life and work independently in all ecosystems.

19. **Assertion (A) :** It is advised that while diluting an acid one should add water to acid and not acid to water keeping the solution continuously stirred. **1**

Reason (R) : The process of dissolving an acid into water is highly exothermic.

20. **Assertion (A) :** Amoeba takes in food using finger like extensions of the cell surface. **1**

Reason (R) : In all unicellular organisms, the food is taken in by the entire cell surface.

SECTION – B

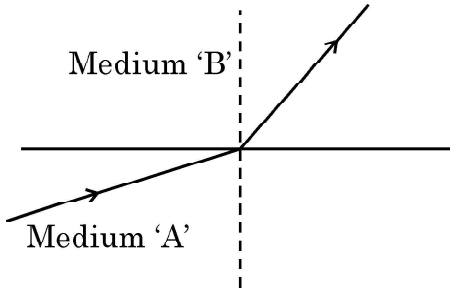
Q. No. **21** to **26** are Very Short Answer Questions.

21. A metal nitrate 'A' on heating gives a metal oxide along with evolution of a brown coloured gas 'B' and a colourless gas, which helps in burning. Aqueous solution of 'A' when reacted with potassium iodide forms a yellow precipitate.

(a) Identify 'A' and 'B'

(b) Name the types of both the reactions involved in the above statement. **2**

22. A light ray enters from medium A to medium B as shown in the figure.



(a) Which one of the two media is denser w.r.t. other medium ? Justify your answer. **1**

(b) If the speed of light in medium A is v_a and in medium B is v_b, what is the refractive index of B with respect to A. **1**

OR

(a) A ray of light starting from diamond is incident on the interface separating diamond and water. Draw a labelled ray diagram to show the refraction of light in this case. **1**

(b) Absolute refractive indices of diamond and water are 2.42 and 1.33 respectively. Find the value of refractive index of water w.r.t. diamond. **1**

23. State the rule to determine the direction of a (a) magnetic field produced around a straight conductor carrying current and (b) force experienced by a current carrying straight conductor placed in a magnetic field which is perpendicular to it. **2**

24. Three resistors of 6 Ω, 4 Ω and 4 Ω are connected together so that the total resistance is 8 Ω. Draw a diagram to show this arrangement and give reason to justify your answer. **2**

25. Give the name of the enzyme present in the fluid in our mouth cavity. State the gland which produces it. What would happen to the digestion process if this gland stops secreting this enzyme ? **2**

26. (a) List two differences between the movement of leaves of a sensitive plant and the movement of a shoot towards light. **2**

OR

(b) What happens at synapse between two neurons ? State briefly. **2**

SECTION – C

Q. No. **27** to **33** are Short Answer Questions.

27. What is a solenoid ? When does a solenoid behave as a magnet ? Draw the pattern of the magnetic field produced inside it showing the directions of the magnetic field lines. **3**

28. State reasons for Myopia. With the help of ray diagrams, show the

(a) image formation by a myopic eye, and

(b) correction of myopia using an appropriate lens. **3**

29. (a) Some plants like pea plants have tendrils which help them to climb up other plants. Explain how is it done. Name the plant hormone responsible for this movement. **3**

OR

(b) Name the phenomenon occurring in plants which are under the control of gravity, water and chemicals with one example each that shows the movement involved. **3**

30. Explain the process of transport of oxygenated and deoxygenated blood in a human body. **3**

31. A reddish brown metal used in electrical wires when powdered and heated strongly turns black. When hydrogen gas is passed over this black substance, it regains its original colour. Based on this information answer the following questions – **3**

(a) Name the metal and the black substance formed.

(b) Write balanced chemical equations for the two reactions involved in the above information.

32. (a) A substance 'X' is used as a building material and is insoluble in water. When it reacts with dil. HC*l*, it produces a gas which turns lime water milky. **3**

(i) Write the chemical name and formula of 'X'.

(ii) Write chemical equations for the chemical reactions involved in the above statements.

OR

(b) A metal 'M' on reacting with dilute acid liberates a gas 'G'. The same metal also liberates gas 'G' when reacts with a base. **3**

(i) Write the name of gas 'G'.

(ii) How will you test the presence of this gas ?

(iii) Write chemical equations for the reactions of the metal with (1) an acid and (2) a base.

33. If a harmful chemical enters in a food chain comprising peacock, plants, rats and snakes, which of these organisms is likely to have the highest concentration of the chemical in its body. Justify your answer. Name the process involved and define it. **3**

SECTION – D

Q. No. 34 to **36** are Long Answer Questions.

34. (a) (i) What are isomers ? Write the structures of two compounds having molecular formula C_3H_6O and give their names.

(ii) What are soaps ? How are they chemically different from detergents ? Why do soaps not work effectively in hard water ? **5**

OR

(b) (i) What is a homologous series of carbon compounds ? Write general formula for alkynes. Name and draw the electron dot structure of first homologue of this series.

(ii) State the meaning of the functional group in an organic compound. Write the formula of the functional group present in alcohols and carboxylic acids. **5**

35. (a) (i) What is meant by resistance of a conductor ? Define its SI unit.

(ii) List two factors on which the resistance of a rectangular conductor depends.

(iii) How will the resistance of a wire be affected if its

(1) length is doubled, and

(2) radius is also doubled ?

Give justification for your answer. **5**

OR

(b) In an electric circuit three bulbs of 100 W each are connected in series to a source. In another circuit set of three bulbs of the same wattage are connected in parallel to the same source.

(i) Will the bulb in the two circuits glow with the same brightness ? Justify your answer.

(ii) Now, let one bulb in both the circuits get fused. Will the rest of the bulbs continue to glow in each circuit ? Give reason for your answer. **5**

36. Give reason for the following :

(a) During reproduction inheritance of different proteins will lead to altered body designs.

(b) Fertilization cannot take place in flowers if pollination does not occur.

(c) All multicellular organisms cannot give rise to new individuals through fragmentation or regeneration.

(d) Vegetative propagation is practised for growing only some type of plants.

(e) The parents and off-springs of organisms reproducing sexually have the same number of chromosomes. **5**

SECTION – E

Q. No. 37 to 39 are case based / data based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. A student took three concave mirrors of different focal lengths and performed the experiment to see the image formation by placing an object at different distances with these mirrors as shown in the following table. **4**

Case No.	Object-distance	Focal length
I	45 cm	20 cm
II	30 cm	15 cm
III	20 cm	30 cm

Now answer the following questions :

(a) List two properties of the image formed in Case I.

(b) In which one of the cases given in the table, the mirror will form real image of same size and why ?

(c) Name the type of mirror used by dentists. Give reason why do they use such type of mirrors.

OR

(c) Look at the table and identify the situation (object distance and focal length) which resembles the situation in which concave mirrors are used as shaving mirrors ? Draw a ray diagram to show the image formation in this case.

38. On the basis of reactivity metals are grouped into three categories – 4

(i) Metals of low reactivity

(ii) Metals of medium reactivity

(iii) Metals of high reactivity

Therefore metals are extracted in pure form from their ores on the basis of their chemical properties.

Metals of high reactivity are extracted from their ores by electrolysis of the molten ore.

Metals of low reactivity are extracted from their sulphide ores, which are converted into their oxides. The oxides of these metals are reduced to metals by simple heating.

(a) Name the process of reduction used for a metal that gives vigorous reaction with air and water both.

(b) Carbon cannot be used as a reducing agent to obtain aluminium from its oxide ? Why ?

(c) Describe briefly the method to obtain mercury from cinnabar. Write the chemical equation for the reactions involved in the process.

OR

(c) Differentiate between roasting and calcination giving chemical equation for each.

39. All human chromosomes are not paired. Most human chromosomes have a maternal and a paternal copy, and we have 22 such pairs. But one pair called the sex chromosomes, is odd in not always being a perfect pair. Women have a perfect pair of sex chromosomes. But men have a mismatched pair in which one is normal sized while the other is a short one. **4**

(a) In humans, how many chromosomes are present in a Zygote and in each gamete ?

(b) A few reptiles rely entirely on environmental cues for sex determination. Comment.

(c) "The sex of a child is a matter of chance and none of the parents are considered to be responsible for it". Justify it through flow chart only.

OR

(c) Why do all the gametes formed in human females have an X chromosome ?

Strictly Confidential: (For Internal and Restricted use only)
Secondary School Examination, 2023
Marking Scheme – Science (SUBJECT CODE -086)
(PAPER CODE –31/6/2)

General Instructions: -

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.

2. **"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under various rules of the Board and IPC."**

3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.**

4. The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.

5. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after delibration and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.

6. Evaluators will mark(√) wherever answer is correct. For wrong answer CROSS 'X" be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**

7. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.

8. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.

9. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.

10. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

11. A full scale of marks **80** (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.

12. Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.

13. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong totaling of marks awarded on a reply.
    - Wrong transfer of marks from the inside pages of the answer book to the title page.
    - Wrong question wise totaling on the title page.
    - Wrong totaling of marks of the two columns on the title page.
    - Wrong grand total.
    - Marks in words and figures not tallying / not same.
    - Wrong transfer of marks from the answer book to online award list.
    - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
    - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

14. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

15. Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

16. The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for spot Evaluation**" before starting the actual evaluation. Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

17. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

18. The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme

MARKING SCHEME

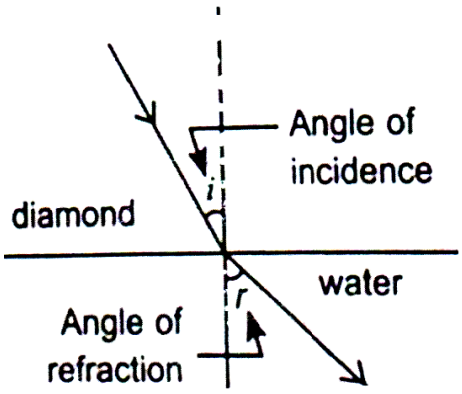
Secondary School Examination, 2023

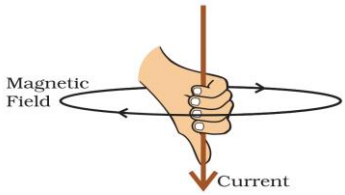
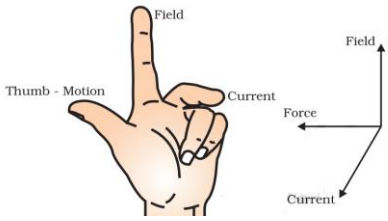
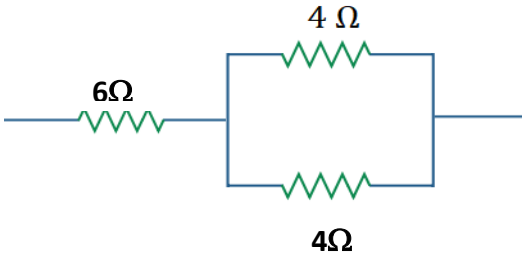
SCIENCE (Subject Code-086)

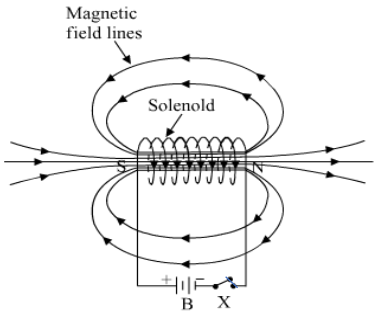
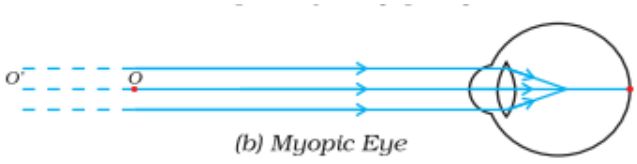
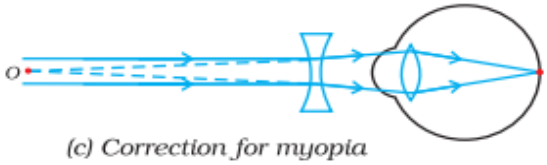
[Paper Code:31/6/2]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(b)	1	1
2.	(b)	1	1
3.	(d)	1	1
4.	(d)	1	1
5.	(b)	1	1
6.	(b)	1	1
7.	(d)	1	1
8.	(b)	1	1
9.	(c)	1	1
10.	(a)	1	1
11.	(d)	1	1
12.	(b)	1	1
13.	(c)	1	1
14.	(c)	1	1
15.	(c)	1	1
16.	(d)	1	1
17.	(a)	1	1
18.	(c)	1	1
19.	(d)	1	1
20.	(c)	1	1

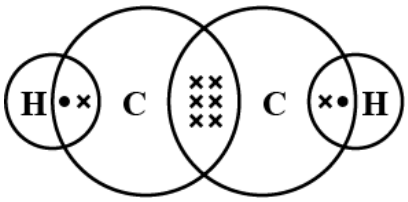
	SECTION B		
21.	(a) A = Lead Nitrate/$Pb(NO_3)_2$ B = Nitrogen dioxide/NO_2 (b) Decomposition reaction Double-displacement or Precipitation reaction.	½ ½ ½ ½	2
22.	(a) Medium B In medium B ray of light bends towards normal / $\angle r < \angle i$ (b) Refractive index of Medium 'B' with respect of Medium 'A' is $n_{BA} = \frac{v_a}{v_b}$ **OR** (a)  **(Credit marks for $\angle i$, $\angle r$ and arrows.)** (b) $n_{21} = \frac{n_{2a}}{n_{1a}}$ $\frac{1 \cdot 33}{2 \cdot 42}$ or 0·55	½ ½ 1 1 ½ ½	2
23.	(a)**Right-Hand Thumb Rule :** Hold the current carrying conductor in right hand, such that thumb indicates direction of current, then the fingers will wrap around conductor in the direction of field lines of the magnetic field.	1	

	Alternate answer of the statement  (b)**Fleming's Left Hand Rule:** Stretch the forefinger, middle finger, and thumb of the left hand such that they are mutually perpendicular to each other. If the forefinger indicates the direction of the magnetic field, the middle finger indicates the direction of current, then the thumb points in the direction of motion or force acting on the conductor. **Alternate answer of the statement**  **All the physical quantities mentioned in the diagram are mutually perpendicular to each other.**	1	2
24.	 $\frac{1}{R_p} = \left(\frac{1}{4} + \frac{1}{4}\right) = \frac{2}{4} => R_p = 2\Omega$ R=6Ω + 2Ω	1 ½ ½	2
25.	Salivary amylase / Ptyalin – Enzyme. Salivary gland The breakdown of starch into sugar will not take place.	½ ½ 1	2
26.	(a) Movement of Leaves of Sensitive plant | Movement of shoot towards light It is not a growth related movement. | It is due to the growth in plant stem Fast | Slow		

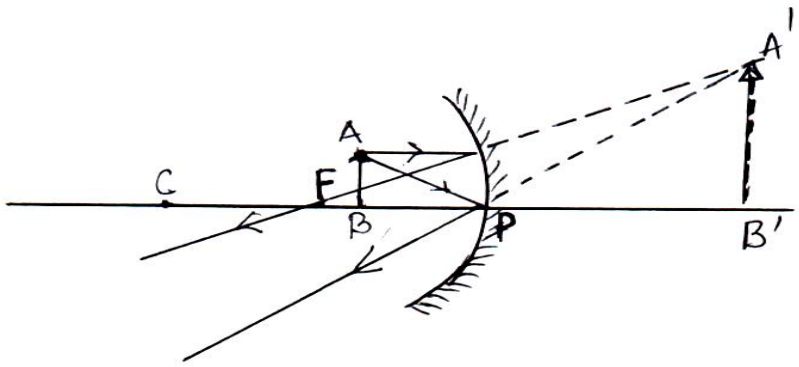
		Reversible response / Irreversible response Non directional movement. / Directional movement. Stimulus -touch / Stimulus -light **or any other (any two)**	1+1	
		OR (b) At synapse the electrical signals are converted into chemicals, that can easily cross the gap and pass on to the next neurons, where it is again converted into electric signals. In this way the impulse is transmitted from one neuron to another.	2	2
		SECTION C		
27.		• A solenoid is a coil of many turns of insulated copper wires wrapped closely in the shape of a cylinder • When electric current is passed through it  (Deduct ½ mark if direction of current or magnetic field is not marked.)	1 1 1	3
28.		• excessive curvature of the eye lens • elongation of the eyeball (a)  *(b) Myopic Eye* (b)  *(c) Correction for myopia*	½ ½ 1 1	3

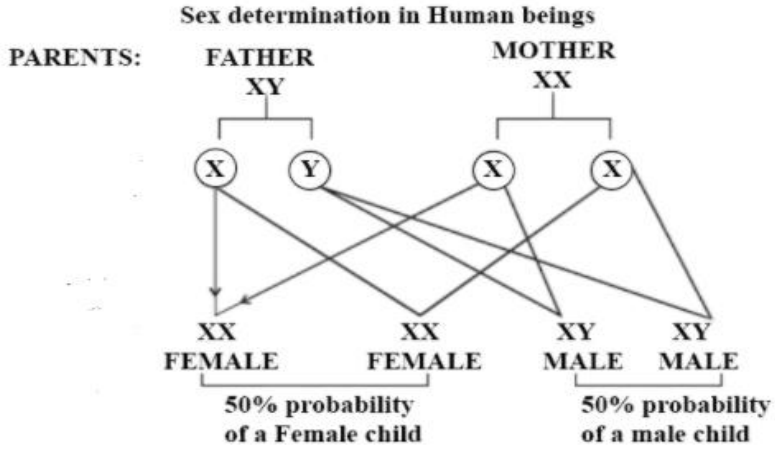
29.	(a) • Tendrils are sensitive to touch, when they come in contact with any support. The part of the tendril in contact with the object does not grow as rapidly as the part of the tendril away from the object. This causes the tendril to circle around the object and cling to it. • Auxin **OR** (b) Geotropism : - Downward growth of roots/Growth of roots in response to gravity. Hydrotropism : - Movement of roots towards water. Chemotropism : - growth of pollen tubes towards ovule in response to chemical.	2 1 ½ , ½ ½ , ½ ½ , ½	3
30.	• Oxygen rich blood from the lungs comes to the left atrium of heart. • It then contracts and the blood is transferred to left ventricle. • Left ventricle in turn contracts and the blood is pumped out to the body. • Deoxygenated blood from the body enters the right atrium. • On its contraction, blood enters into right ventricle • Right ventricle pumps it to the lungs for oxygenation	½ ½ ½ ½ ½ ½	3
31.	(a) Cu / Copper CuO / Copper Oxide (b) $2Cu + O_2 \xrightarrow{Heat} 2CuO$ $CuO + H_2 \rightarrow Cu + H_2O$	½ ½ 1 1	3
32.	(a) (i) Chemical Name : Calcium Carbonate Chemical formula : $CaCO_3$ (ii) • $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2 \uparrow$ • $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$ **OR** (b) (i) Hydrogen / H_2 (ii) The gas burns with a pop sound (iii) (1) $2HCl + Zn \rightarrow ZnCl_2 + H_2$ (2) $2NaOH + Zn \rightarrow Na_2ZnO_2 + H_2$	½ ½ 1 1 ½ ½ 1 1	3

33.	• Peacock • Because peacock is occupying the top level of this food chain and the concentration of these non-biodegradable chemicals increase as we move up in a food chain. • Process involved - Biomagnification The increase in the concentration of harmful chemicals or (non-biodegradable substances) which accumulate progressively in the successive trophic levels of a food chain.	½ 1 ½ 1	3
	SECTION D		
34.	(a) (i) Compounds having same molecular formula but different structural formula Structures are : $CH_3CH_2-\overset{\overset{O}{\|}}{C}-H$ Propanal $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$ Propanone (ii) •Soaps are sodium or potassium salts of long-chain carboxylic acids / $R\text{-}COO^- Na^+$ • detergents are ammonium salts with chlorides or bromides ions or Sodium salts of sulphonic acids/ $R\text{-}OSO_3^- Na^+$ • Soaps react with calcium or magnesium ions present in hard water to form an insoluble substance / soaps react with hard water forming scum. **OR** (b) (i) A series of compounds in which the same functional group substitutes for hydrogen in a carbon chain / having similar chemical. properties and differ by– CH_2. General formula C_nH_{2n-2} Ethyne	1 ½ , ½ ½ , ½ ½ ½ 1 1 ½	

	Electronic dot structure  (ii) Functional group is an atom or a group of atoms (hetero atom) bonded to a carbon chain. It defines the chemical property of the organic compound. Alcohol – OH Carboxylic Acid – COOH / $-\overset{\overset{O}{\|}}{C}-OH$	½ 1 1 ½ ½	5
35.	(a) (i) The property of conductor to resist the flow of charges through it. If potential difference across the two ends of a conductor is 1V and the current through it is 1A, then resistance 'R' of the conductor is 1Ω. Alternate answer $1\Omega = \frac{1 \text{ volt}}{1 \text{ ampere}} \quad / \quad \frac{1\,V}{1A}$ (ii) • Length of the conductor • Area of cross-section of the conductor • Nature of the material • Temperature **(any two)** (iii) (1) The resistance will become one half of its original value. $R = \rho\frac{l}{A} = \rho\frac{l}{\pi r^2}$ $R' = \frac{\rho.2L}{\pi(2r)^2}$ (2) $R' = \frac{\rho.l}{\pi(2r)^2}.\frac{2}{4} = \frac{R}{2}$ Resistance will reduce to one half. **OR**	1 1 ½ , ½ ½ ½ ½ ½	

	(b) (i) No • In series combination overall resistance will increase hence decreasing the current . Potential difference also divides. Therefore power consumption is less by each bulb and glows with less brightness. • In parallel combination each bulb will get the required potential difference hence the required current and will glow with its normal brightness. (ii) None of the bulb glows in series combination as the circuit gets broken and current stops flowing. In parallel combination the other two bulbs will glow with same brightness as the same voltage is available to them.	1 1 1 1 1	5
36.	(a) As DNA is the information source for making proteins. If the information is changed, different protein will be made and will lead to altered body design. (b) In the absence of pollination no male gametes will be available for fertilisation. (c) Because in many multi cellular organisms specialised cells are organised into tissues, tissues form organ occupying definite positions in the body. (d) 1. Plants can bear flowers and fruits earlier than those produced from seeds. 2. It enables the propagation of plants such as banana, orange, rose and jasmine which have lost the capacity to produce seeds. 3. The plants produced are genetically similar enough to the parent plant to have all the characteristics **(any one point)** (e) During gamete formation the number of chromosomes is reduced to half. When the zygote is formed / at the time of fertilisation, fusion of male and female gametes restores the original number of chromosomes in the offspring as in the parent.	1 1 1 ½ , ½ 1	5
	SECTION E		
37.	(a) Real, inverted, diminished (Any two) (b) Case II Because focal length of mirror is 15 cm, object distance is 30cm which means the object is placed at C.	½ , ½ ½ ½	

	(c) Dentists use concave mirrors Because concave mirror forms erect and enlarged image when the object is very close to the mirror. **OR** (c) Case III  (Deduct ½ mark if direction of ray is not marked.)	1 1 1 1	4
38.	(a) By electrolytic reduction (b) Carbon cannot reduce the oxides of highly reactive metals / these metals have more affinity for oxygen than carbon. (c) When Cinnabar is heated in the presence of air, it is first converted into mercuric oxide. / This is then reduced to mercury. $2HgS + 3O_2 \xrightarrow{heat} 2HgO + 2SO_2$ $2HgO \xrightarrow{heat} 2Hg + O_2$ **OR** (c) Roasting: A process in which sulphide ores are converted into oxides by heating strongly in the presence of excess air. $2ZnS + 3O_2 \xrightarrow{heat} 2ZnO + 2SO_2$ Calcination: A process in which carbonate ores are heated in limited supply air. $ZnCO_3 \xrightarrow{heat} ZnO + CO_2$ **(or any other)**	1 1 1 ½ ½ 2	4
39.	(a) Zygote – 23 pairs / 46 chromosomes. Gamete – 23 chromosomes. (b) The temperature at which fertilised eggs are kept determines whether the animals developing in the eggs are male or female.	½ ½ 1	

	(c)  **OR** (c) The 23rd pair or the sex chromosome in human females contains 'XX' chromosome. At the time of gamete formation, each gamete gets one X-chromosome from mother	2 2	 4

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