

**Series Z1XYW/5****SET~2****प्रश्न-पत्र कोड
Q.P. Code****31/5/2****रोल नं.
Roll No.**

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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 **27** 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 छात्र 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 **27** 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 students 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 :

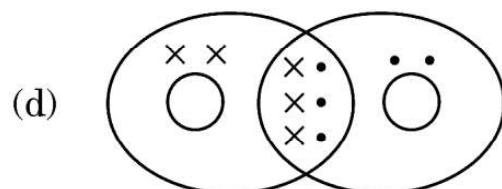
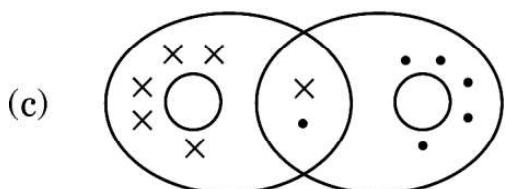
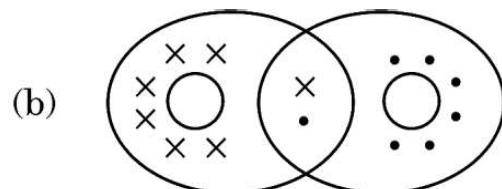
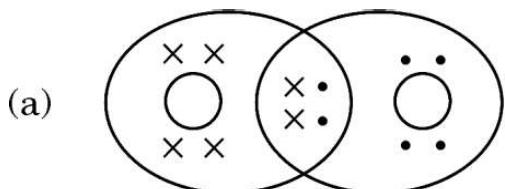
Read the following instructions very carefully and strictly follow them :

- (i) This question paper comprises **39** questions. **All** questions are compulsory.
- (ii) This question paper is divided into **five** sections – **A, B, C, D** and **E**.
- (iii) **Section A** – Questions No. **1** to **20** are multiple choice questions. Each question carries **1** mark.
- (iv) **Section B** – Questions No. **21** to **26** are very short answer type questions. Each question carries **2** marks. Answer to these questions should be in the range of **30** to **50** words.
- (v) **Section C** – Questions No. **27** to **33** are short answer type questions. Each question carries **3** marks. Answer to these questions should be in the range of **50** to **80** words.
- (vi) **Section D** – Questions No. **34** to **36** are long answer type questions. Each question carries **5** marks. Answer to these questions should be in the range of **80** to **120** words.
- (vii) **Section E** – Questions No. **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. Only one of the alternatives has to be attempted in such questions.

SECTION A

This section has **20** multiple choice questions (Q.No. 1 – 20). **All** questions are **compulsory**. $20 \times 1 = 20$

1. The correct representation of covalent bonding in an oxygen molecule is :





2. Hydronium ions are formed by the reaction between :

(a) Sodium hydroxide and water (b) Calcium chloride and water
(c) Hydrogen chloride gas and water (d) Ethanol and water

3. Which of the following statements is true for an amphoteric oxide ?

(a) It reacts only with acid and does not form water.
(b) It reacts with acid as well as base to form salt and hydrogen gas.
(c) It reacts with both acid as well as base to form salt and water.
(d) It reacts only with base and does not form water.

4. Fresh milk has a pH of 6. To delay its curdling, a chemical substance is added to it, which is :

(a) Sodium carbonate
(b) Baking powder
(c) Sodium hydroxide (Caustic soda)
(d) Baking soda (Sodium hydrogen carbonate)

5. Study the following chemical reaction :

$$2 \text{Na (s)} + 2 \text{H}_2\text{O (l)} \longrightarrow 2 \text{NaOH (aq)} + \text{H}_2 \text{ (g)} \uparrow$$

The reducing agent in this reaction is :

(a) Na (b) H_2O
(c) NaOH (d) H_2

6. The balanced chemical equation showing reaction between quicklime and water is :

(a) $2 \text{CaO} + \text{H}_2\text{O} \longrightarrow 2 \text{CaOH} + \text{H}_2 + \text{Heat}$
(b) $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca(OH)}_2 + \text{H}_2 + \text{Heat}$
(c) $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca(OH)}_2 + \text{Heat}$
(d) $2 \text{CaO} + 3 \text{H}_2\text{O} \longrightarrow 2 \text{Ca(OH)}_3 + \text{O}_2 + \text{Heat}$





12. The process in which loss of water in the form of vapours from the aerial parts of plants takes place is X , which helps in Y . Here X and Y respectively are :

- (a) transpiration and photosynthesis.
- (b) transpiration and temperature regulation.
- (c) translocation and movement of soluble products of photosynthesis in phloem.
- (d) translocation and absorption of water and minerals from soil by roots.

13. For a current in a long straight solenoid, N and S poles are created at the two ends. Among the following statements, the **incorrect** statement is :

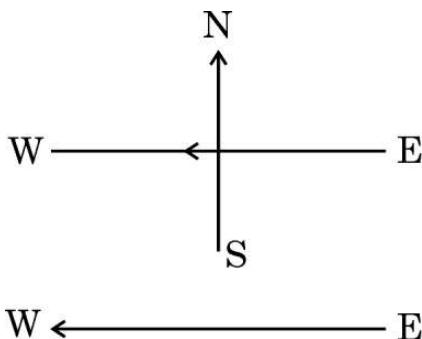
- (a) The magnetic field lines inside the solenoid are in the form of straight lines, which indicates that the magnetic field is uniform at all points inside the solenoid.
- (b) The strong magnetic field produced inside the solenoid can magnetize the soft iron placed inside it.
- (c) The pattern of the magnetic field associated with a current carrying solenoid is different from the pattern of the magnetic field around a bar magnet.
- (d) The N and S poles exchange positions when the direction of current through the solenoid is reversed.

14. An electric kettle consumes 1 kW of electric power when operated at 220 V. The minimum rating of the fuse wire to be used for it is

- (a) 1 A
- (b) 2 A
- (c) 4 A
- (d) 5 A



15. A constant current flows in a horizontal wire in the plane of the paper from east to west as shown in the figure. The direction of the magnetic field will be north to south at a point :



(a) directly above the wire.

(b) directly below the wire.

(c) located in the plane of the paper on the north side of the wire.

(d) located in the plane of the paper on the south side of the wire.

16. The expressions that relate (i) Q , I and t and (ii) Q , V and W respectively are (Here the symbols have their usual meanings) :

(a) (i) $I = \frac{Q}{t}$ (ii) $W = \frac{V}{Q}$

(b) (i) $Q = I \times t$ (ii) $W = V \times Q$

(c) (i) $Q = \frac{I}{t}$ (ii) $V = \frac{W}{Q}$

(d) (i) $I = \frac{Q}{t}$ (ii) $Q = \frac{V}{W}$



For questions number 17 to 20, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of the Assertion (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.

17. *Assertion (A):* The magnetic field lines around a current carrying straight wire do not intersect each other.

Reason (R): The magnitude of the magnetic field produced at a given point increases as the current through the wire increases.

18. *Assertion (A) :* The walls of atria are thicker than those of the ventricles.

Reason (R): Ventricles have to pump blood into various organs at high pressure.

19. *Assertion (A) :* Human populations show a great deal of variations in traits.

Reason (R) : All variations in a species have equal chances of surviving in the environment in which they live.

20. *Assertion (A) :* In the following reaction



ZnO undergoes reduction.

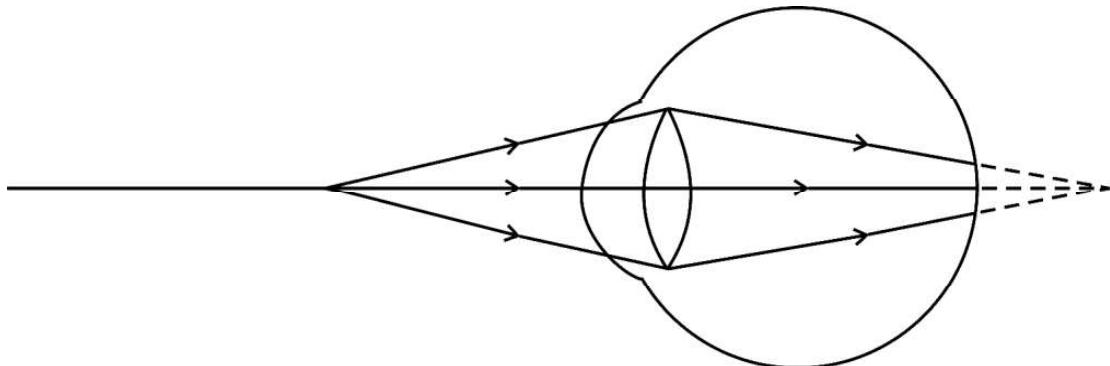
Reason (R) : Carbon is a reducing agent that reduces ZnO to Zn.

SECTION B

21. State two reasons why human-made materials like plastics persist for a long time in the environment. 2



22. Observe the following diagram showing an image formation in an eye :



(a) Identify the defect of vision shown in the figure.
(b) List its two causes and suggest a suitable corrective lens to overcome this defect. 2

23. (a) Why is it important to prevent oxygenated and deoxygenated blood from mixing in birds and mammals ?
(b) Which animals can tolerate some mixing of the oxygenated and deoxygenated blood streams ? On what factor does the body temperature of these animals depend ? 2

24. Write one important function each of the following in the human respiratory system :
(a) Rings of Cartilage
(b) Alveoli
(c) Haemoglobin
(d) Lining of mucus 2

25. (a) List the events in proper sequence that take place during the process of photosynthesis. 2
OR

(b) Explain in brief two ways by which leaves of a plant help in excretion. 2

26. (a) On heating 'X' at 373 K, it loses water molecules and becomes 'Y'. 'Y' is a substance which doctors use for supporting fractured bones in the right position.
(i) Identify 'X' and 'Y'.
(ii) How can 'X' be reobtained from 'Y' ? 2

OR



(b) Two solutions M and N give Red and Blue colour respectively with a universal indicator.

(i) In which solution will the hydrogen ion concentration be more ? Justify your answer.

(ii) If both M and N solutions are mixed and the resultant mixture is tested with a universal indicator, it turns green. What is the nature of the salt formed ? Justify your answer.

2

SECTION C

27. Explain how some harmful chemicals enter our bodies through the food chain. Why is the concentration of these harmful chemicals found to be maximum in human beings ?

28. (a) (i) A straight cylindrical conductor is suspended with its axis perpendicular to the magnetic field of a horse-shoe magnet. The conductor gets displaced towards left when a current is passed through it. What will happen to the displacement of the conductor if the

(1) current through it is increased ?

(2) horse-shoe magnet is replaced by another stronger horse-shoe magnet ?

(3) direction of current through it is reversed ?

(ii) Name and state the rule for determining the direction of force on a current carrying conductor in a magnetic field.

3

OR

(b) Draw the pattern of the magnetic field produced around a vertical current carrying straight conductor passing through a horizontal cardboard. Mark the direction of current and the magnetic field lines. Name and state the rule which is used to determine the direction of magnetic field associated with a current carrying conductor.

3



29. Draw a labelled diagram of a common type of bifocal lens. State the function of each of its parts. Name the defect for the correction of which it is used and state its main cause. 3

30. (a) (i) An object of 5 cm height is placed at a distance of 20 cm from the optical centre of a concave lens of focal length 18 cm. Calculate (1) image distance and (2) the magnification in this case.
(ii) Compare the values of magnification obtained by a concave lens and a convex lens when both the lenses form virtual images. 3

OR

(b) A convex lens can form a (i) real, inverted and magnified image as well as (ii) virtual, erect and magnified image of an object. If the focal length of the lens is 10 cm, what should be the range of the object distance in both cases ? Draw ray diagrams to justify your answer. 3

31. (a) With the help of an activity, explain the action of saliva on the food we eat.
(b) Why is bile juice important in the process of digestion ? 3

32. (a) How is a universal indicator better than litmus solution ?
(b) State two features of pH scale.
(c) Why should we not add water to a concentrated acid ? 3

33. (a) Define a double displacement reaction.
(b) Write the chemical equation of a double displacement reaction which is also a (i) Neutralization reaction and (ii) Precipitation reaction. Give justification for your answer. 3

SECTION D

34. There are three resistors of $10\ \Omega$, $20\ \Omega$ and $30\ \Omega$ joined in parallel in a circuit. The potential difference across the electric circuit is 10 V.
(a) Draw a circuit diagram for the above case.
(b) Find the total resistance of the combination of resistors.
(c) Calculate the electric current drawn from the same source. 5

35. (a) (i) Where are testes located in the human males and why ? State two function of the testes.



(ii) In the human female, one of the ovaries releases an egg every month. State the changes that take place if

- (1) the egg is fertilized, and
- (2) the egg is not fertilized.

(iii) What is done during the surgical method in males and females to prevent pregnancy ?

5

OR

(b) (i) What happens when :

- (1) Leaves of Bryophyllum fall on the soil ?
- (2) Planaria is cut into many pieces ?
- (3) Sporangia of Rhizopus on maturation liberate spores ?

Mention the modes of reproduction in each of the above three cases.

(ii) Write the changes that occur in a flower once the fertilisation has taken place.

5

36. (a) (i) Butane had both Carbon – Carbon bonds as well as Carbon – Hydrogen bonds. Draw its structural formula and state the number of (1) C – H bonds and (2) C – C bonds in it.

(ii) You have two carbon compounds with the molecular formula C_3H_6O . Name two compounds with this formula and also draw their structural formula.

5

OR

(b) (i) What is saponification ? Differentiate between soaps and detergents on the basis of the following :

- (1) Their chemical composition
- (2) Their mechanism in hard water

(ii) Explain the formation of micelles between oily dirt and soap molecules. Also draw its diagram.

5



SECTION E

The following questions are source-based/case-based questions. Read the case carefully and answer the questions that follow.

37. Many optical instruments consist of a number of lenses. They are combined to increase the magnification and sharpness of the image. The net power (P) of the lenses placed in contact is given by the algebraic sum of the powers of the individual lenses $P_1, P_2, P_3 \dots$ as

$$P = P_1 + P_2 + P_3 \dots$$

This is also termed as the simple additive property of the power of lens, widely used to design lens systems of cameras, microscopes and telescopes. These lens systems can have a combination of convex lenses and also concave lenses.

- (a) What is the nature (convergent / divergent) of the combination of a convex lens of power + 4D and a concave lens of power - 2D ? 1
- (b) Calculate the focal length of a lens of power - 2.5D. 1
- (c) Draw a ray diagram to show the nature and position of an image formed by a convex lens of power + 0.1D, when an object is placed at a distance of 20 cm from its optical centre. 2

OR

- (c) How is a virtual image formed by a convex lens different from that formed by a concave lens ? Under what conditions do a convex and a concave lens form virtual images ? 2

38. In some families, either rural or urban, females are tortured for giving birth to a female child. They do not seem to understand the scientific reason behind the birth of a boy or a girl. In fact the mother is not responsible for the sex of the child and it has been genetically proved that the sex of a newborn is determined by what the child inherits from the father.

- (a) State the basis on which the sex of a newborn baby is determined in humans. 1



(b) Why is the pair of sex chromosomes called a mismatched pair in males ? 1

(c) How is the original number of chromosomes present in the parents restored in the progeny ? 2

OR

(c) Explain by giving two examples of the organisms in which the sex is not genetically determined. 2

39. Metals are required for a variety of purposes. For this we need their extraction from their ores. Ores mined from the earth are usually contaminated with many impurities which must be removed prior to the extraction of metals. The extraction of pure metal involves the following steps :

(1) Concentration of ore

(2) Extraction of the metal from the concentrated ore

(3) Refining of the metal

(a) Name an ore of Mercury and state the form in which Mercury is present in it. 1

(b) What happens to zinc carbonate when it is heated strongly in a limited supply of air ? 1



(c) The reaction of a metal A with Fe_2O_3 is highly exothermic and is used to join railway tracks.

(I) Identify the metal A and name the reaction taking place.

(II) Write the chemical equation for the reaction of metal A with Fe_2O_3 . 2

OR

(c) We cannot use carbon to obtain sodium from sodium oxide. Why ? State the reactions taking place at cathode and anode during electrolytic reduction of sodium chloride. 2

Strictly Confidential: (For Internal and Restricted use only)
Secondary School Examination, 2023
Marking Scheme – Science (SUBJECT CODE -086)
(PAPER CODE -31/5/2)

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 deliberation 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.

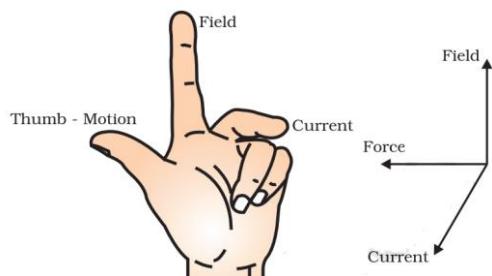
MARKING SCHEME
 Secondary School Examination, 2023
SCIENCE (Subject Code-086)
[Paper Code: 31/5/2]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1	(a)	1	1
2	(c)	1	1
3	(c)	1	1
4	(d)	1	1
5	(a)	1	1
6	(c)	1	1
7	(a)	1	1
8	(d)	1	1
9	(c)	1	1
10	(c)	1	1
11	(b)	1	1
12	(b)	1	1
13	(c)	1	1
14	(d)	1	1
15	(b)	1	1
16	(b)	1	1
17	(b)	1	1
18	(d)	1	1
19	(c)	1	1
20	(a)	1	1
	SECTION B		
21	<ul style="list-style-type: none"> • Plastics are non-bio degradable. / Decomposers like bacteria and fungi cannot breakdown plastics into simpler substances. •They are inert substances. 	$\frac{1}{2}$ $\frac{1}{2}$	2
22	<ul style="list-style-type: none"> (a) Hypermetropia/Far sightedness (b) •Focal length is too long •Size of eyeball is small. •Convex lens/Converging lens 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
23	<ul style="list-style-type: none"> (a) • Birds and mammals have high energy needs to maintain their body temperature. (b) • Amphibians / reptiles • The temperature of the environment. 	$\frac{1}{2}$ $\frac{1}{2}$	2
24	<ul style="list-style-type: none"> (a) (a) They ensure that the air passage does not collapse / trachea (b) They provide a surface where exchange of gases take place. (c) They transport oxygen to tissues . 		

	(d) Inhaled air is filtered.	$\frac{1}{2} \times 4$	2
25	(a) (i) Absorption of light energy by chlorophyll. (ii) Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen. (iii) Reduction of carbon dioxide to carbohydrates. OR (b) (i) Excess water is excreted by transpiration. (ii) Oxygen as waste products of photosynthesis is excreted through stomata. (iii) Shedding of leaves.	$\frac{1}{2}$ 1 $\frac{1}{2}$ (or any two)	
26	(a) (i) $\text{X} = \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ /Gypsum / Calcium sulphate dihydrate $\text{Y} = \text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ /Plaster of Paris/Calcium sulphate hemi-hydrate (ii) $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} + 1\frac{1}{2}\text{H}_2\text{O} \longrightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ OR (b) (i) M, it is an acidic solution (ii) Neutral M is an acid and N is a base. / Neutralization reaction	$\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}, \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
	SECTION C		
27	<ul style="list-style-type: none"> Some harmful substances like pesticides are used to protect crops. When these chemicals are washed down in the soil or water bodies, they are absorbed by plants along with water and minerals and by animals from water. When we consume these food items, the pesticides enter our body. <p>(Alternate answer: If the child explains the question through food chain, credit marks.)</p> <ul style="list-style-type: none"> As human beings occupy the top level in any food chain, maximum concentration of these chemicals get accumulated in them. 	2 1	3
28	(a) (i) (1) Increased. (2) Increased. (3) The direction of displacement is reversed (ii) • Flemings left-hand rule <ul style="list-style-type: none"> According to this rule, stretch the thumb, forefinger and middle finger of left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor. 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1	

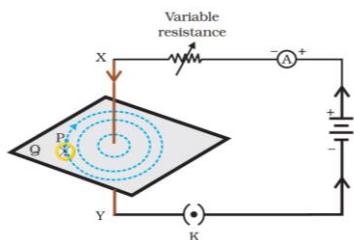
Alternate answer of the statement



All the physical quantities mentioned in the diagram should be perpendicular to each other.

OR

(b) •



- Pattern
- Direction of current
- Magnetic field direction

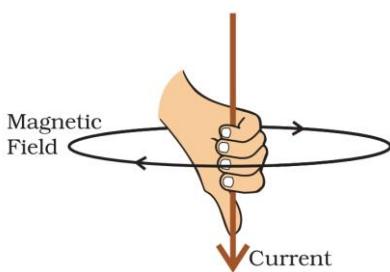
$\frac{1}{2}$
 $\frac{1}{2}$
 $\frac{1}{2}$

(Note: If the variable resistor and ammeter are not drawn, do not deduct marks.)

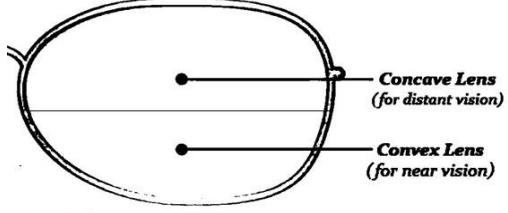
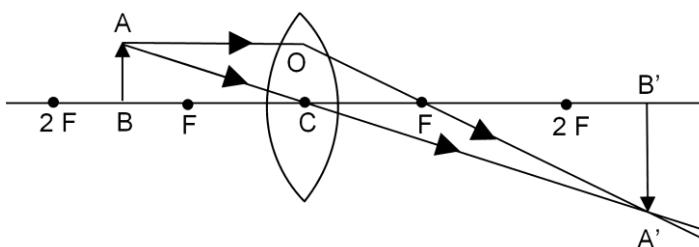
- Right hand thumb Rule
- Imagine that we are holding a current carrying straight conductor in our right hand such that the thumb points towards the direction of current. Then our finger will wrap around the conductor in the direction of the field lines of the magnetic field.

$\frac{1}{2}$
1

Alternate answer of the statement:



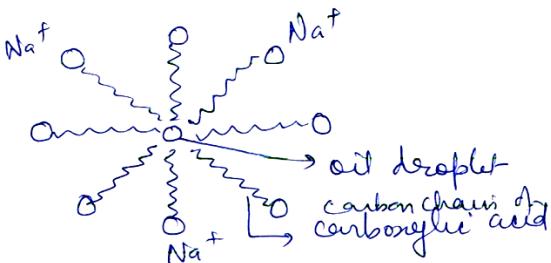
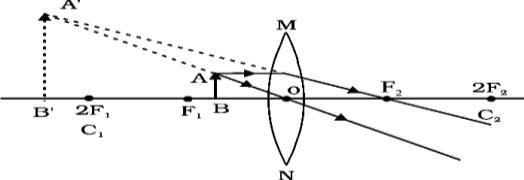
3

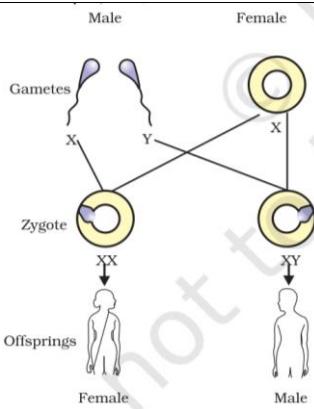
29		1	
	<ul style="list-style-type: none"> • The concave lens (upper portion of bifocal lens) facilitates distant vision. $\frac{1}{2}$ • The convex lens (lower portion of bifocal lens) facilitates near vision. $\frac{1}{2}$ • Presbyopia <ul style="list-style-type: none"> - Diminishing flexibility of the eye lens. $\frac{1}{2}$ - Gradual weakening of ciliary muscles $\frac{1}{2}$ 	(any one cause)	3
30	<p>(a) Given,</p> <p>Height of object (h) = 5 cm Object distance (u) = -20 cm Focal length (f) = -18 cm Image distance (v) = ?</p> <p>(i)</p> $(1) \frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\frac{1}{v} = \frac{1}{u} + \frac{1}{f} = \frac{1}{-20} + \frac{1}{-18} = - \left[\frac{18 + 20}{360} \right]$ $= \frac{-38}{360}$ $\Rightarrow v = \frac{-360}{38} = -9.47 \text{ cm}$ $(2) m = \frac{v}{u} = \frac{-9.47}{-20} = 0.47$ <p>(ii) For convex lens : $m > 1$, for concave lens $m < 1$</p> <p style="text-align: center;">OR</p> <p>(b) (i) $20 \text{ cm} > u > 10 \text{ cm}$ / Between 10 cm and 20 cm $\frac{1}{2}$ (ii) Object distance less than 10 cm / $10 > u > 0$ $\frac{1}{2}$</p> <p>(i)</p> 	1	

	(ii)		1	
		(Deduct ½ mark for not marking the direction of ray)		3
31	(a)	<ul style="list-style-type: none"> Take 1 ml 1% starch solution in two test tubes A and B. Add 1 ml saliva in test tube A and leave both test tubes undisturbed for 20 – 30 minutes. Now add a few drops of iodine to both the test tubes. The colour of iodine does not change in the test tube A as starch is converted to sugar by enzymes present in saliva. The colour of iodine changes to blue-black in test tube B because it contains only starch solution. <p>[Note: If quantity is not mentioned do not deduct marks] (or any other activity)</p>	$\frac{1}{2} \times 4$	
	(b)	<p>(1) Bile changes the acidic medium of food to alkaline medium so that the pancreatic enzymes can act on it.</p> <p>(2) It also emulsifies fats. / Breaks down the large fat globules into smaller particles.</p> <p>(any one)</p>	1	3
32	(a)	Universal Indicator gives a wide range of colours of acids and bases whereas Litmus solution only one colour change. / Universal indicator gives the strength of acids/bases, Litmus does not.	1	
	(b)	<p>(i) Its range is 0 to 14.</p> <p>(ii) It measures hydrogen ion concentration in a solution.</p> <p>(iii) as H^+ concentration decreases pH increases and vice versa</p> <p>(any two)</p>	$\frac{1}{2}$ $\frac{1}{2}$	
	(c)	If water is added to concentrated acid, the heat generated may cause the mixture to splash out and cause burns / excess heat is generated.	1	3
33	(a)	Reactions in which there is an exchange of ions between the reactants.	1	
	(b) (i)	<p>$HCl + NaOH \longrightarrow NaCl + H_2O$ (or any other reaction)</p> <p>• Acid reacts with base forming salt and water.</p>	$\frac{1}{2}$ $\frac{1}{2}$	
	(ii)	Precipitation Reaction :		
		<p>$Na_2SO_4 + BaCl_2 \longrightarrow BaSO_4 + 2NaCl$ (or any other reaction)</p> <p>• Insoluble substance or precipitate($BaSO_4$) is formed.</p>	$\frac{1}{2}$ $\frac{1}{2}$	3

SECTION D				
34	(a)			
		2		
	(b)	$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ $= \frac{1}{10} + \frac{1}{20} + \frac{1}{30}$ $= \frac{6+3+2}{60}$ $\therefore R = \frac{60}{11} \Omega / 5.45 \Omega$	$\frac{1}{2}$	
	(c)	$I = \frac{V}{R}$ $I = \frac{10 \text{ V}}{\frac{60}{11} \Omega} = \frac{110}{60} \text{ A} = 1.83 \text{ A}$	$\frac{1}{2}$	1
35	(a) (i) Outside the abdominal cavity in scrotum, sperm formation requires a lower temperature than the normal body temperature. Function: <ul style="list-style-type: none"> •Formation of sperms / male gamete •Production of testosterone / male sex hormone (ii) (1) The fertilized egg (zygote) starts dividing to form embryo and gets implanted in the lining of uterus. (2)The inner lining of uterus slowly breaks and comes out through the vagina as blood and mucous. (iii) Vas deferens is blocked / Vasectomy in males. Fallopian tube is blocked / Tubectomy in females. OR (b) (i) (1) Buds present on the leaf margins in notches begin to grow to give rise to a new plant – Vegetative propagation	$\frac{1}{2}$, $\frac{1}{2}$	5	

	<p>(2) Each part of Planaria grows into complete organism – Regeneration.</p> <p>(3) The spores begin to grow after reaching a suitable moist surface – Spore formation.</p> <p>(ii)</p> <ul style="list-style-type: none"> • Zygote divides several times to form an embryo within the ovule. • Ovule develops a tough coat and is converted into seed. • Ovary grows rapidly and ripens to form a fruit. • Petals, sepals, stamens, style and stigma may shrivel and fall off. 	$\frac{1}{2}, \frac{1}{2}$									
36	<p>(a) (i)</p> $ \begin{array}{ccccccc} & \text{H} & \text{H} & \text{H} & \text{H} & & \\ & & & & & & \\ \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{C} & - \text{H} & \\ & & & & & & \\ & \text{H} & \text{H} & \text{H} & \text{H} & & \end{array} $ <p>Number of C – H bonds = 10</p> <p>Number of C – C bonds = 3</p> <p>(ii) • Propanone</p> $ \begin{array}{ccccc} & \text{H} & \text{O} & \text{H} & \\ & & \parallel & & \\ \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{H} \\ & & & & \\ & \text{H} & & \text{H} & \end{array} $ <p>• Propanal</p> $ \begin{array}{ccccc} & \text{H} & \text{H} & \text{O} & \\ & & & \diagdown & \\ \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{H} \\ & & & & \\ & \text{H} & & \text{H} & \end{array} $ <p>OR</p> <p>(b) (i) It is a reaction in which an alkali reacts with an ester to form alcohol and a salt of carboxylic acid. /</p> <p>Alternate Answer of b (i)</p> $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \longrightarrow \text{CH}_3\text{COONa} + \text{C}_2\text{H}_5\text{OH}$	$\frac{1}{2} \times 4$	5								
	<table border="1"> <thead> <tr> <th></th> <th>Soap</th> <th>Detergent</th> <th></th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>Sodium or potassium salts of long chain carboxylic acids . (RCOO^-Na^+)</td> <td>Sodium salts of long chain Sulphonic acid ($\text{ROSO}_3^-\text{Na}^+$)</td> <td>1</td> </tr> </tbody> </table>		Soap	Detergent		(1)	Sodium or potassium salts of long chain carboxylic acids . (RCOO^-Na^+)	Sodium salts of long chain Sulphonic acid ($\text{ROSO}_3^-\text{Na}^+$)	1		
	Soap	Detergent									
(1)	Sodium or potassium salts of long chain carboxylic acids . (RCOO^-Na^+)	Sodium salts of long chain Sulphonic acid ($\text{ROSO}_3^-\text{Na}^+$)	1								

		/ ammonium salts of chloride or bromide ions.		
(2)	Forms an insoluble scum in hardwater .	Does not form insoluble scum in hard-water.	1	
	(ii) Micelle formation :		1	
	The ionic end of soap dissolves in water while the carbon chain dissolves in oily dirt. The soap molecules, thus form structures called micelles where one end of the molecules is towards the oil droplet while the ionic side faces outside.		1	
				
	SECTION E			
37	(a) Convergent	1		
	(b) $f(m) = \frac{1}{P} = \frac{1}{-2.5} = -0.4 \text{ m or } -40 \text{ cm}$	$\frac{1}{2}, \frac{1}{2}$		
	(c)			
				
	OR			
	(c) • Convex lens – magnified	$\frac{1}{2}$		
	Concave lens – diminished	$\frac{1}{2}$		
	• Convex – object between O and F	$\frac{1}{2}$		
	Concave – object anywhere between optical centre and infinity.	$\frac{1}{2}$		4
38	(a) If X chromosome of male sperm fuses with X chromosome of female ova, girl child is born. If Y chromosome of male sperm fuses with X chromosome of female ova, boy child is born.	$\frac{1}{2}$	$\frac{1}{2}$	
	Alternate answer:			



(b) Because one is a normal sized 'X' while the other is a short one 'Y'.

1

(c)

- During formation of germ cell/gametes the chromosome number is reduced to half.
- When two germ cells from two individuals combine to form a new individual, they restore the original number of chromosomes.

8

(c) Example 1 : Reptiles – The temperature at which fertilized eggs are kept determines whether the animals developing in the eggs will be male or female.

Example 2 : Snails – Individuals can change sex during their lifetime.

1/2, 1/2

1/2 1/2

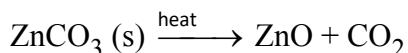
4

39 (a) Cinnabar ; HgS (Sulphide form)
(b) It forms Zinc oxide (Calcination)

$\frac{1}{2}, \frac{1}{2}$

1

Alternate answer:



(c) (I) Aluminium, Thermit Reaction

1/3 1/3

$$(II) \text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow 2\text{Fe} + \text{Al}_2\text{O}_3 + \text{Heat}$$

OR

(b) • Sodium has more affinity for oxygen than carbon / Sodium is highly reactive.

1

- At cathode $\text{Na}^+ + \text{e}^- \longrightarrow \text{Na}$

1/2

• At anode $2\text{Cl}^- \longrightarrow \text{Cl}_2 + 2\text{e}^-$

1/2