


**Series Z1XYW/5**
**SET~1**

प्रश्न-पत्र कोड

Q.P. Code

**31/5/1**

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 की 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.  $20 \times 1 = 20$

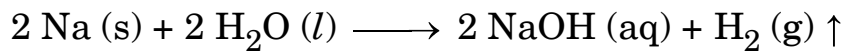
1. Select a pair of olfactory indicators from the following :
 

(a) Clove oil and vanilla essence	(b) Onion and turmeric
(c) Clove oil and litmus solution	(d) Vanilla and methyl orange
  
2. 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) $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{H}_2 + \text{Heat}$
(c) $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{Heat}$
(d) $2 \text{CaO} + 3 \text{H}_2\text{O} \longrightarrow 2 \text{Ca}(\text{OH})_3 + \text{O}_2 + \text{Heat}$



3. Study the following chemical reaction :



The reducing agent in this reaction is :

- (a) Na (b) H<sub>2</sub>O  
(c) NaOH (d) H<sub>2</sub>

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)

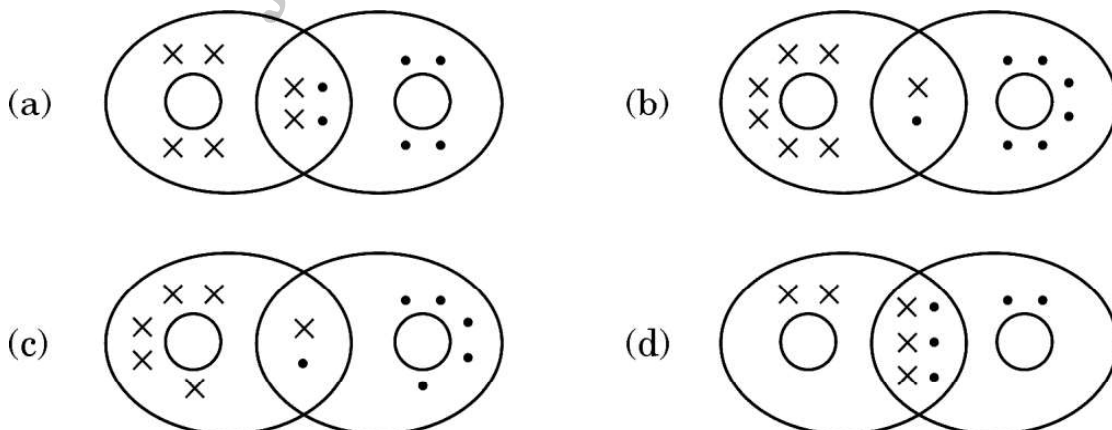
5. Which of the following statements is true for an amphoteric oxide ?

- (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.

6. 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

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





8. 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 :
- transpiration and photosynthesis.
  - transpiration and temperature regulation.
  - translocation and movement of soluble products of photosynthesis in phloem.
  - translocation and absorption of water and minerals from soil by roots.
9. As compared to terrestrial organisms, the rate of breathing in aquatic organisms is :
- faster because they need more oxygen for their survival.
  - faster because the amount of dissolved oxygen in water is fairly low.
  - slower because the amount of dissolved oxygen in water is fairly low.
  - slower because the capacity of water of dissolving atmospheric air is limited.
10. Consider the following two statements :
- The trait that expresses itself in  $F_1$  generation.
  - The trait that keeps on passing from one generation to another.
- The appropriate terms for the statements (i) and (ii) respectively are :
- Recessive trait, Dominant trait
  - Dominant trait, Recessive trait
  - Dominant trait, Inherited trait
  - Recessive trait, Inherited trait
11. The part in which gustatory receptors are present in our body is :
- |               |                          |
|---------------|--------------------------|
| (a) inner ear | (b) skin                 |
| (c) tongue    | (d) inner lining of nose |
12. The bacterial and the viral infections that may be caused due to unsafe sex respectively are :
- |                             |                        |
|-----------------------------|------------------------|
| (a) Warts and HIV-AIDS      | (b) HIV-AIDS and Warts |
| (c) Gonorrhoea and Syphilis | (d) Syphilis and Warts |



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

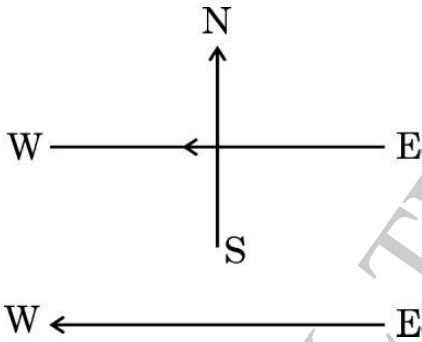
(a) (i)  $I = \frac{Q}{t}$                       (ii)  $W = \frac{V}{Q}$

(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)  $Q = \frac{V}{W}$

14. 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.

15. 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



16. 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 :
- 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.
  - The strong magnetic field produced inside the solenoid can magnetize the soft iron placed inside it.
  - 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.
  - The N and S poles exchange positions when the direction of current through the solenoid is reversed.

**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 :**

- Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
  - Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of the Assertion (A).
  - Assertion (A) is true, but Reason (R) is false.
  - Assertion (A) is false, but Reason (R) is true.
17. *Assertion (A)* : In the following reaction
- $$\text{ZnO} + \text{C} \longrightarrow \text{Zn} + \text{CO}$$
- ZnO undergoes reduction.
- Reason (R)* : Carbon is a reducing agent that reduces ZnO to Zn.
18. *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.
19. *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.
20. *Assertion (A)* : Two 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.

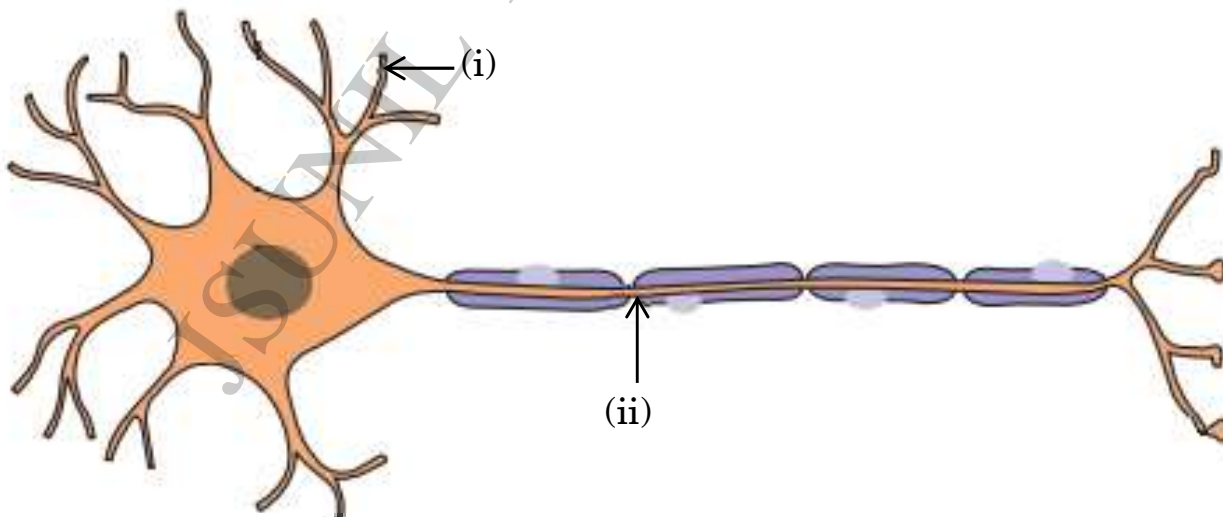


## SECTION B

21. (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
22. Write the name and function of parts (i) and (ii) in the diagram of a neuron given below. 2



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

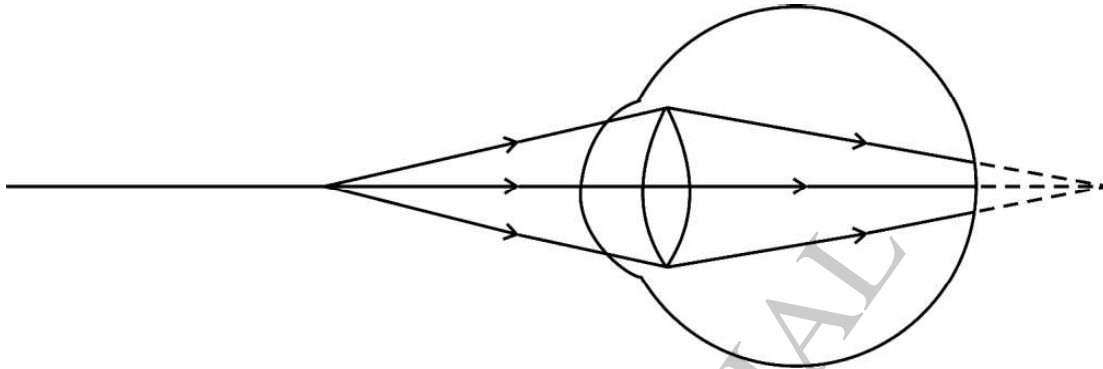
OR

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



24. In the process of digestion of food in human beings, two protein-digesting enzymes are secreted. Name the enzymes along with the glands that secrete them. 2

25. 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

26. In the following food chain, if 50 J of energy was available to the hawk, how much energy would have been present at the first and third trophic levels ? Justify your answer. 2

Grass  $\longrightarrow$  Grasshopper  $\longrightarrow$  Frog  $\longrightarrow$  Snake  $\longrightarrow$  Hawk

### SECTION C

27. (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

28. (a) Sometimes the pH of our mouth gets lower than 5.5. Why ?

(b) A basic salt 'X' is obtained by heating baking soda followed by crystallisation. Identify 'X' and state its two industrial uses.

(c) Why do copper sulphate crystals turn white on heating ? 3





29. (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
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) State one important function of the following parts of the human eye :
- (i) Retina
- (ii) Pupil
- (b) State the role of ciliary muscles in focussing objects at varying distances from the eye. 3
32. (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

33. How is ozone formed in the higher levels of the atmosphere? "Damage to the ozone layer is a cause of concern." Justify this statement. 3

**SECTION D**

34. (a) A neutral organic compound 'X' (Molecular formula  $C_2H_6O$ ) on reacting with acidified  $K_2Cr_2O_7$  gives an organic compound 'Y' which is acidic in nature. 'X' reacts with 'Y' on warming in the presence of conc.  $H_2SO_4$  to give a sweet smelling compound 'Z'.
- (i) Identify 'X', 'Y' and 'Z'.
- (ii) Write the chemical equations for the reactions in the conversion of (1) 'X' to 'Y' and (2) 'X' to 'Z'.
- (iii) State the role of (1) acidified  $K_2Cr_2O_7$  in the conversion of 'X' to 'Y' and (2) conc.  $H_2SO_4$  in the reaction of 'X' and 'Y'.
- (iv) Name the reaction which occurs when 'Z' reacts with an alkali. 5

**OR**



(b) Carry out the following conversions, stating the condition(s) for each :

5

- (i) Ethanol  $\longrightarrow$  Ethene
- (ii) Ethene  $\longrightarrow$  Ethane
- (iii) Ethane  $\longrightarrow$  Chloroethane
- (iv) Ethanol  $\longrightarrow$  Ethanoic acid
- (v) Ethanoic acid  $\longrightarrow$  Ethyl ethanoate

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

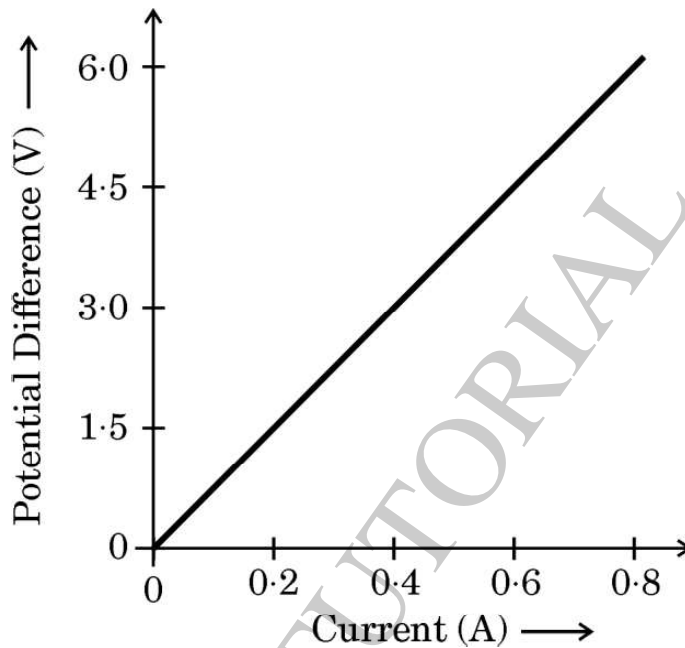
**OR**

- (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) State Ohm's Law.
- (b) Name and define the physical quantity determined by the slope of V – I curve given in the diagram. Use this graph to find the value of this physical quantity in SI units.



- (c) Establish the relationship between 1 kWh and 1 joule.

5

### SECTION E

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

37. 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  $\text{Fe}_2\text{O}_3$  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  $\text{Fe}_2\text{O}_3$ . 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

**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.** 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  $+ 4 \text{ D}$  and a concave lens of power  $- 2 \text{ D}$ ? 1
- (b) Calculate the focal length of a lens of power  $- 2.5 \text{ D}$ . 1
- (c) Draw a ray diagram to show the nature and position of an image formed by a convex lens of power  $+ 0.1 \text{ D}$ , when an object is placed at a distance of  $20 \text{ cm}$  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

## MARKING SCHEME

Secondary School Examination, 2023

## SCIENCE (Subject Code-086)

[ Paper Code: 31/5/1]

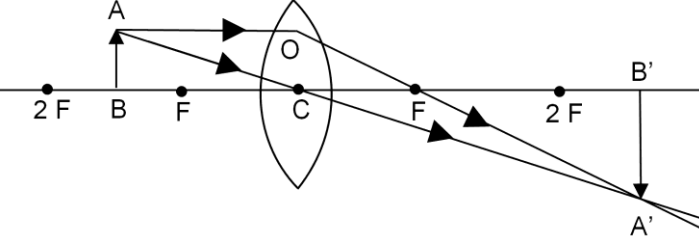
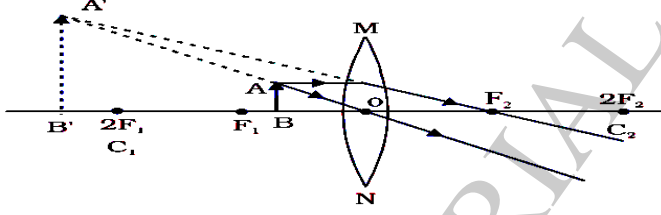
Maximum Marks: 80

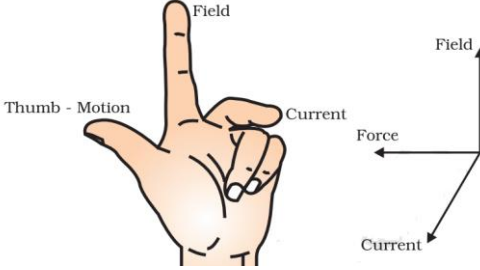
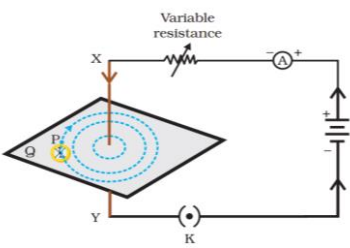
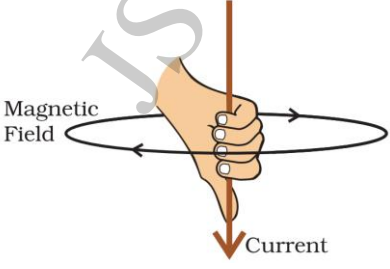
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
<b>SECTION–A</b>			
1	(a)	1	1
2	(c)	1	1
3	(a)	1	1
4	(d)	1	1
5	(c)	1	1
6	(c)	1	1
7	(a)	1	1
8	(b)	1	1
9	(b)	1	1
10	(c)	1	1
11	(c)	1	1
12	(d)	1	1
13	(b)	1	1
14	(b)	1	1
15	(d)	1	1
16	(c)	1	1
17	(a)	1	1
18	(c)	1	1
19	(d)	1	1
20	(b)	1	1
<b>SECTION B</b>			
21	(a) (i) X = $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ /Gypsum / Calcium sulphate dihydrate Y = $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ /Plaster of Paris/ Calcium sulphate hemi-hydrate	$\frac{1}{2}$ $\frac{1}{2}$	

	(ii) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O} + 1 \frac{1}{2} \text{H}_2\text{O} \longrightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ <b>OR</b> (b) (i) M, it is an acidic solution (ii) Neutral M is an acid and N is a base./Neutralization reaction	1  $\frac{1}{2}, \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
22	(i) Dendron / Dendrite – Information is acquired (ii) Axon – Through which information travels as an electrical impulse.	$\frac{1}{2}, \frac{1}{2}$ $\frac{1}{2}, \frac{1}{2}$	2
23	(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. <b>OR</b> (b) (i) Excess water is excreted by transpiration. (ii) Oxygen as waste product of photosynthesis is excreted through stomata. (iii) Shedding of leaves.	$\frac{1}{2}$  1  $\frac{1}{2}$  1,1  <b>(any two)</b>	2
24	Gastric gland – Pepsin Pancreas – Trypsin	$\frac{1}{2} \times 4$	2
25	(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
26	The energy at first trophic level will be 5,00,000 J. The energy at third trophic level will 5000 J. 10% can be taken as the average value for the amount of organic matter/energy that is present at each step and reaches the next level of consumers.	$\frac{1}{2}$  $\frac{1}{2}$  1	2
<b>SECTION C</b>			
27	(a) Reactions in which there is an exchange of ions between the reactants. (b) (i) • $\text{HCl} + \text{NaOH} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$ <b>(or any other reaction)</b> •Acid reacts with base forming salt and water. (ii) • $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$ <b>(or any other reaction)</b> •Insoluble substance or precipitate( $\text{BaSO}_4$ ) is formed.	1  $\frac{1}{2}$ $\frac{1}{2}$  $\frac{1}{2}$ $\frac{1}{2}$	3
28	(a) Bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth after eating. (b) X : $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ / Washing soda /	1  $\frac{1}{2}$	



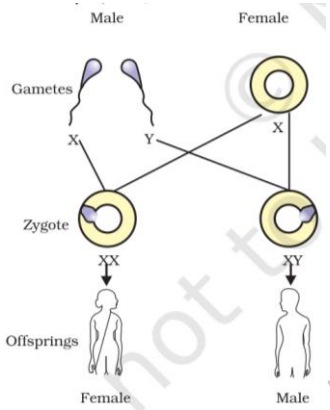
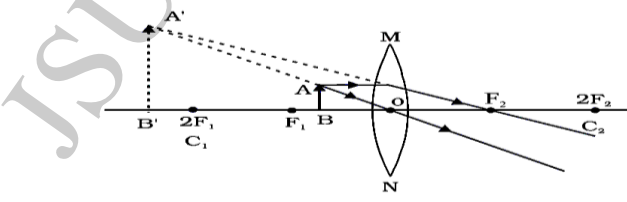
	<p>Sodium carbonate decahydrate</p> <p>Uses :</p> <ul style="list-style-type: none"> <li>• Glass, soap and paper industries</li> <li>• Manufacture of borax</li> <li>• Cleaning agent</li> <li>• Removing permanent hardness of water</li> </ul> <p>(c) The water of crystallisation is removed./</p> $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \xrightarrow{\text{heat}} \text{CuSO}_4 + 5\text{H}_2\text{O} \uparrow$ <p style="text-align: center;">(white)</p>	<p>(any two) <math>\frac{1}{2}, \frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	<p>3</p>
29	<p>(a)</p> <ul style="list-style-type: none"> <li>• Take 1 ml 1% starch solution in two test tubes A and B.</li> <li>• 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.</li> <li>• The colour of iodine does not change in the test tube A as starch is converted to sugar by enzymes present in saliva.</li> <li>• The colour of iodine changes to blue-black in test tube B because it contains only starch solution.</li> </ul> <p style="text-align: center;"><b>[Note: If quantity is not mentioned do not deduct marks] (or any other activity)</b></p> <p>(b) (1) Bile changes the acidic medium of food to alkaline medium so that the pancreatic enzymes can act on it. (2) It also emulsifies fats. / Breaks down the large fat globules into smaller particles.</p> <p style="text-align: right;"><b>(any one)</b></p>	<p><math>\frac{1}{2} \times 4</math></p> <p>1</p>	<p>3</p>
30	<p>(a) Given, Height of object (h) = 5 cm Object distance (u) = - 20 cm Focal length (f) = - 18 cm Image distance (v) = ?</p> <p>(i)</p> <p>(1) <math>\frac{1}{v} - \frac{1}{u} = \frac{1}{f}</math></p> $\frac{1}{v} = \frac{1}{u} + \frac{1}{f} = \frac{1}{-20} + \frac{1}{-18} = - \left[ \frac{18 + 20}{360} \right]$ $= \frac{-38}{360}$ $\Rightarrow v = \frac{-360}{38} = -9.47 \text{ cm}$ <p>(2) <math>m = \frac{v}{u} = \frac{-9.47}{-20} = 0.47</math></p> <p>(ii) For convex lens : <math>m &gt; 1</math> , for concave lens <math>m &lt; 1</math></p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}, \frac{1}{2}</math></p> <p><math>\frac{1}{2}, \frac{1}{2}</math></p>	

	<p style="text-align: center;"><b>OR</b></p> <p>(3) (i) <math>20\text{ cm} &gt; u &gt; 10\text{ cm}</math> / Between 10 cm and 20 cm                  (ii) Object distance less than 10 cm / <math>10 &gt; u &gt; 0</math></p> <p>(i)</p>  <p>(ii)</p>  <p style="text-align: center;"><b>(Deduct ½ mark for not marking the direction of ray)</b></p>	<p>½ ½</p> <p>1</p> <p>1</p> <p>3</p>	
<p><b>31</b></p>	<p>(a) (i) Retina behaves like a light sensitive screen on which image of an object is formed.</p> <p>(ii) Pupil : regulates and controls the amount of light entering the eye.</p> <p>(b) When ciliary muscles relax or contract they change the curvature of eye lens and hence the focal length to focus objects at varying distances from the eye.</p> <p><b>[Alternate answer of (b): It regulates the focal length or thickness of the lens.]</b></p>	<p>1</p> <p>1</p> <p>1</p> <p>3</p>	
<p><b>32</b></p>	<p>(a) (i) (1) Increased.                  (2) Increased.                  (3) The direction of displacement is reversed</p> <p>(ii) • Flemings left-hand rule                  • 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.</p>	<p>½ ½ ½</p> <p>½</p> <p>1</p>	

	<p><b>Alternate answer of the statement</b></p>  <p><i>All the physical quantities mentioned in the diagram should be perpendicular to each other.</i></p> <p style="text-align: center;"><b>OR</b></p> <p>(b) •</p>  <ul style="list-style-type: none"> <li>• Pattern</li> <li>• Direction of current</li> <li>• Magnetic field direction</li> </ul> <p><i>(Note: If the variable resistor and ammeter are not drawn, do not deduct marks.)</i></p> <ul style="list-style-type: none"> <li>• Right hand thumb Rule</li> <li>• 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.</li> </ul> <p><b>Alternate answer of the statement:</b></p> 	<p style="text-align: right;">1/2 1/2 1/2</p> <p style="text-align: right;">1/2</p> <p style="text-align: right;">1</p>	<p style="text-align: right;">3</p>
<p><b>33</b></p>	<ul style="list-style-type: none"> <li>• UV radiations act on the oxygen molecule (O<sub>2</sub>) and then split oxygen molecule into free (nascent) oxygen.</li> <li>• These free oxygen atoms combine with oxygen molecule (O<sub>2</sub>) to form ozone (O<sub>3</sub>)</li> </ul>	<p style="text-align: right;">1 1</p>	

	<p><b>Alternate answer:</b></p> $\text{O}_2 \xrightarrow{\text{UV}} \text{O} + \text{O}$ $\text{O} + \text{O}_2 \longrightarrow \text{O}_3$ <p><b>Damage to ozone layer :</b></p> <ul style="list-style-type: none"> <li>• UV radiations reach the Earth and cause harmful effects like skin cancer in human beings.</li> </ul>	1/2 + 1/2	3
	<b>SECTION D</b>		
34	<p>(a) (i) X : CH<sub>3</sub>CH<sub>2</sub>OH / Ethyl alcohol / Ethanol</p> <p>Y : CH<sub>3</sub>COOH / Acetic acid / Ethanoic acid</p> <p>Z : CH<sub>3</sub>COOC<sub>2</sub>H<sub>5</sub> / Ethyl ethanoate / Ethyl acetate</p> <p>(ii)</p> <p>(1) <math>\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Acidified K}_2\text{Cr}_2\text{O}_7} \text{CH}_3\text{COOH}</math></p> <p>(2) <math>\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow[\text{heat}]{\text{Conc. H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}</math></p> <p>(iii) (1) Oxidising agent / provides oxygen</p> <p>(2) Dehydrating agent / helps in removing water</p> <p>(iv) Saponification reaction</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) <math>\text{C}_2\text{H}_5\text{OH} \xrightarrow[443 \text{ K}]{\text{Conc. H}_2\text{SO}_4} \text{C}_2\text{H}_4 + \text{H}_2\text{O}</math></p> <p>(ii) <math>\text{H}_2\text{C}=\text{CH}_2 \xrightarrow[\text{Ni/Pd}]{\text{H}_2} \text{CH}_3 - \text{CH}_3</math></p> <p>(iii) <math>\text{C}_2\text{H}_6 + \text{Cl}_2 \xrightarrow{\text{Sunlight}} \text{C}_2\text{H}_5\text{Cl} + \text{HCl}</math></p> <p>(iv) <math>\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[\text{Acidified K}_2\text{Cr}_2\text{O}_7]{\text{Alkaline KMnO}_4 \text{ or}} \text{CH}_3\text{COOH}</math></p> <p>(v) <math>\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Acid}} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}</math></p>	1/2 1/2 1/2 1 1 1/2 1/2 1/2 1 1 1 1 1	5
35	<p>(a) (i) Outside the abdominal cavity in scrotum, sperm formation requires a lower temperature than the normal body temperature.</p> <p>Function:</p> <ul style="list-style-type: none"> <li>• Formation of sperms / male gamete</li> <li>• Production of testosterone / male sex hormone</li> </ul>	1/2 , 1/2 1/2 1/2	

	<p>(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 mucus.                      (iii) Vas deferens is blocked / Vasectomy in males.                      Fallopian tube is blocked / Tubectomy in females.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) (1) Buds present on the leaf margins in notches begin to grow to give rise to a new plant – Vegetative propagation                      (2) Each part of Planaria grows into complete organism – Regeneration.                      (3) The spores begin to grow after reaching a suitable moist surface – Spore formation.                      (ii)                      • 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.</p>	<p>1  1 ½ ½</p> <p>½, ½ ½, ½ ½, ½</p> <p>½ × 4</p>	<p>5</p>
36	<p>(a) The potential difference V across the ends of a given metallic wire in an electric circuit is directly proportional to the current flowing through it provided its temperature remains the same. /  <math>V \propto I</math> or <math>V = IR</math> (temperature remaining constant)</p> <p>(b) Resistance                      Resistance is the property of a conductor to resist the flow of charges.  <math display="block">R = \text{slope} = \frac{y_2 - y_1}{x_2 - x_1} / \frac{V}{I} = \frac{6 - 0}{0.8 - 0}</math> <math display="block">= \frac{60}{8} = 7.5 \Omega</math></p> <p>(c) <math>1 \text{ kWh} = 1000 \frac{\text{J}}{\text{sec}} \times 3600 \text{ sec}</math>  <math>1 \text{ kWh} = 3.6 \times 10^6 \text{ J}</math></p>	<p>1  1 1 ½  ½</p>	<p>5</p>
<b>SECTION E</b>			
37	<p>(a) Cinnabar ; HgS (Sulphide form)                      (b) It forms Zinc oxide (Calcination)  <b>Alternate answer:</b>  <math display="block">\text{ZnCO}_3 (\text{s}) \xrightarrow{\text{heat}} \text{ZnO} + \text{CO}_2</math></p> <p>(c) (I) Aluminium, Thermit Reaction                      (II) <math>\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow 2\text{Fe} + \text{Al}_2\text{O}_3 + \text{Heat}</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(c) • Sodium has more affinity for oxygen than carbon / Sodium is highly reactive.                      • At cathode <math>\text{Na}^+ + \text{e}^- \longrightarrow \text{Na}</math>                      • At anode <math>2\text{Cl}^- \longrightarrow \text{Cl}_2 + 2\text{e}^-</math></p>	<p>½, ½ 1   ½, ½ 1  1  ½ ½</p>	<p>4</p>

<p>38</p>	<p>(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.</p> <p><b>Alternate answer:</b></p>  <p>(b) Because one is a normal sized 'X' while the other is a short one 'Y'.</p> <p>(c)</p> <ul style="list-style-type: none"> <li>• During formation of germ cell/gametes the chromosome number is reduced to half.</li> <li>• When two germ cells from two individuals combine to form a new individual, they restore the original number of chromosomes.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p>(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.</p> <p>Example 2 : Snails - Individuals can change sex during their lifetime.</p>	<p>1/2</p> <p>1/2</p> <p>1</p> <p>2</p> <p>1/2, 1/2</p> <p>1/2, 1/2</p> <p>4</p>	
<p>39</p>	<p>(a) Convergent</p> <p>(b) <math>f(m) = \frac{1}{P} = \frac{1}{-2.5} = -0.4 \text{ m or } -40 \text{ cm}</math></p> <p>(c)</p>  <p style="text-align: center;"><b>OR</b></p> <p>(c)</p> <ul style="list-style-type: none"> <li>• Convex lens - magnified</li> <li>Concave lens - diminished</li> <li>• Convex - object between O and F</li> <li>Concave - object anywhere between optical centre and infinity.</li> </ul>	<p>1</p> <p>1/2, 1/2</p> <p>2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>4</p>	

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