Series Z1XYW/6

SET ~ 1

प्रश्न–पत्र कोड
Q.P. Code 31/6/1

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. 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

2. Few drops of aqueous solution of ammonium chloride are put on a universal indicator paper. The paper turns pink.

Study the following table and choose the correct option. **1**

	Nature	**Ammonium chloride is a salt of ....**	**Range of pH**
(a)	acidic	weak acid and strong base	less than 7
(b)	basic	weak acid and strong base	more than 7
(c)	acidic	strong acid and weak base	less than 7
(d)	basic	strong acid and strong base	7

3. Select the appropriate state symbols of the products given as X and Y in the following chemical equation by choosing the correct option from table given below : **1**

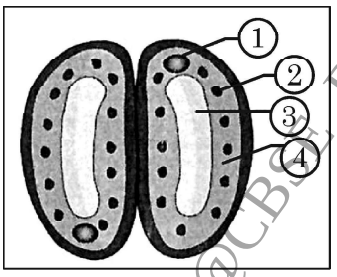
$$Zn_{(s)} + H_2SO_{4(l)} \longrightarrow ZnSO_{4(X)} + H_{2(Y)}$$

	(X)	(Y)
(a)	(s)	(*l*)
(b)	(aq)	(g)
(c)	(aq)	(s)
(d)	(g)	(aq)

4. 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

5. In the given diagram of a closed stomata : (1), (2), (3) and (4) respectively are **1**



(a) nucleus, chloroplast, guard cell, vacuole
(b) nucleus, chloroplast,, vacuole, guard cell
(c) chloroplast, nucleus, vacuole, guard cell
(d) vacuole, guard cell, nucleus, chloroplast

6. 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

7. A student wants to obtain an erect image of an object using a concave mirror of 10 cm focal length. What will be the distance of the object from mirror ? **1**

(a) Less than 10 cm
(b) 10 cm
(c) between 10 cm and 20 cm
(d) more than 20 cm

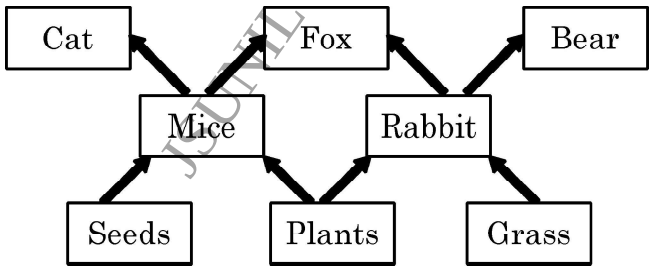
8. Bronze is an alloy of **1**

(a) Copper and Zinc
(b) Aluminium and Tin
(c) Copper, Tin and Zinc
(d) Copper and Tin

9. 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**

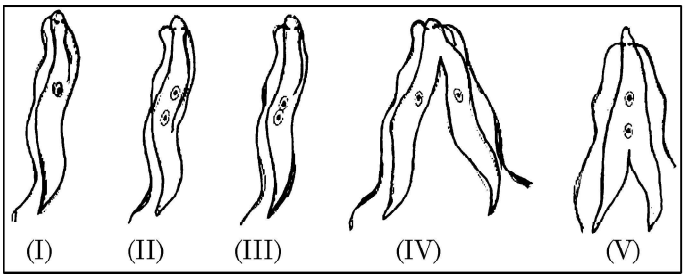
(a) 1 : 3
(b) 3 : 1
(c) 1 : 1
(d) 2 : 1

10. 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

11. 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

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

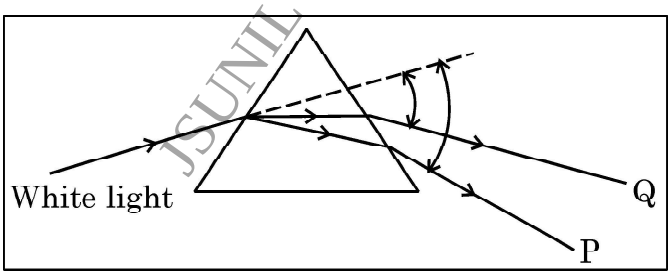
I. $Mg + 2HCl \longrightarrow MgCl_2 + H_2$

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

The correct statement about these equations is –

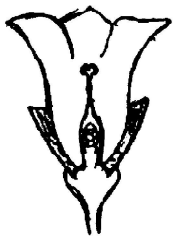
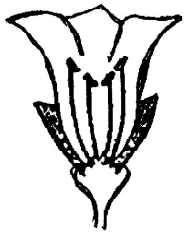
(a) 'I' is a displacement reaction and 'II' is a decomposition reaction.
(b) 'I' is a displacement reaction and 'II' is double displacement reaction.
(c) Both 'I' and 'II' are displacement reactions.
(d) Both 'I' and 'II' are double-displacement reactions.

13. In the following diagram showing dispersion of white light by a glass prism, the colours 'P' and 'Q' respectively are – **1**



(a) Red and Violet
(b) Violet and Red
(c) Red and Blue
(d) Orange and Green

14. 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'

15. 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.

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

(a) Retina (b) Pupil

(c) Eye lens (d) Cornea

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) :** 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.

18. **Assertion (A) :** The energy which passes to the herbivores does not come back to autotrophs. **1**

Reason (R) : The flow of energy in a food chain is unidirectional.

19. **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.

20. **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.

SECTION – B

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

21. State whether the given chemical reaction is a redox reaction or not. Justify your answer. **2**

$$MnO_2 + 4HCl \longrightarrow MnCl_2 + 2H_2O + Cl_2$$

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

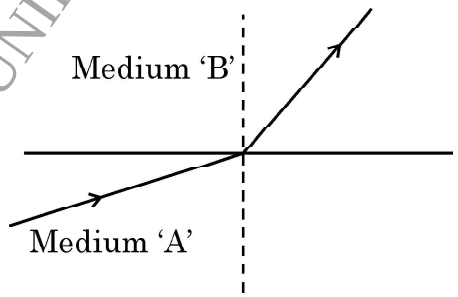
OR

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

23. 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**

24. Let the resistance of an electrical device remain constant, while the potential difference across its two ends decreases to one fourth of its initial value. What change will occur in the current through it ? State the law which helps us in solving the above stated question. **2**

25. 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**

26. 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**

SECTION – C

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

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

28. (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.

(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. **3**

29. (a) Name the gland and the hormone secreted by it in scary situations in human beings. List any two responses shown by our body when this hormone is secreted into the blood. **3**

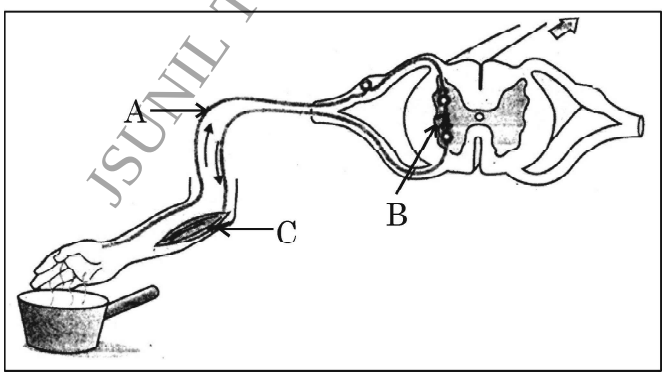
OR

(b) In the given diagram **3**

(i) Name the parts labelled A, B, and C.

(ii) Write the functions of A and C.

(iii) Reflex arcs have evolved in animals ? Why ?



30. With the help of an appropriate example, justify that some of the chemical reactions are determined by

(a) Change in temperature,

(b) Evolution of a gas, and

(c) Change in colour

Give chemical equation for the reaction involved in each case. **3**

31. 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**

32. 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**

33. (a) Write the percentage of (i) solar energy captured by the autotrophs and (ii) energy transferred from autotrophs to the next level in a food chain.

(b) What are trophic levels ? Why do different food chains in an ecosystem not have more than four to five trophic levels ? Give reason. **3**

SECTION – D

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

34. (a) (i) A compound 'A' with a molecular formula of $C_2H_4O_2$ reacts with a base to give salt and water. Identify 'A', state its nature and the name of the functional group it possesses. Write chemical equation for the reaction involved.

(ii) When the above stated compound 'A' reacts with another compound 'B' having molecular formula C_2H_6O in the presence of an acid, a sweet smelling compound 'C' is formed.

(1) Identify 'B' and 'C'.

(2) State the role of acid in this reaction.

(3) Write chemical equation for the reaction involved. **5**

OR

(b) (i) Name the compound formed when ethanol is heated at 443 K in the presence of conc.H_2SO_4 and draw its electron dot structure. State the role of conc.H_2SO_4 in this reaction.

(ii) What is hydrogenation ? Explain it with the help of a chemical equation. State the role of this reaction in industry. **5**

35. 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**

36. (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**

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. 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.

38. 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 ?

39. 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.

JSUNIL TUTORIAL

MARKING SCHEME

Secondary School Examination, 2023

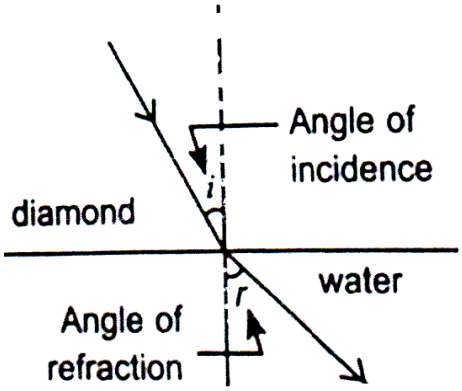
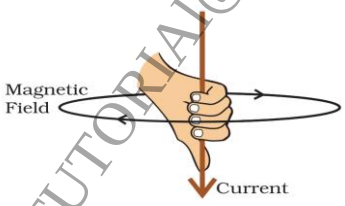
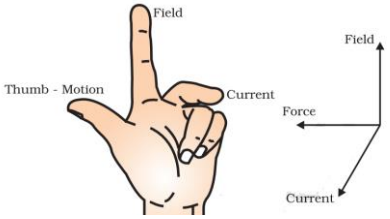
SCIENCE (Subject Code–086)

[Paper Code:31/6/1]

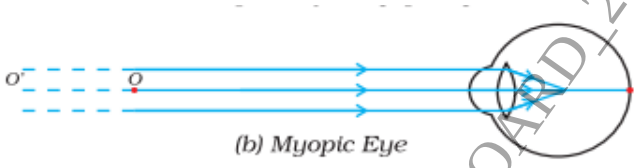
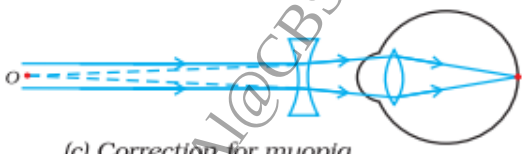
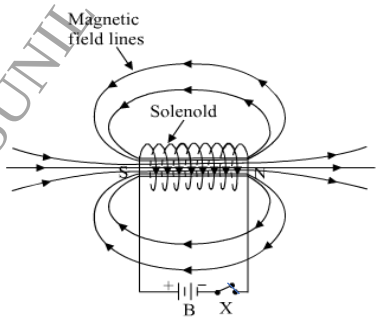
Maximum Marks: 80

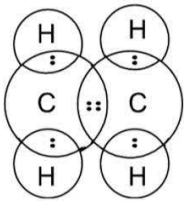
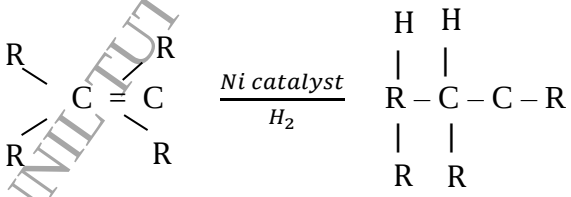
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION -A		
1.	(b)	1	1
2.	(c)	1	1
3.	(b)	1	1
4.	(a)	1	1
5.	(b)	1	1
6.	(c)	1	1
7.	(a)	1	1
8.	(d)	1	1
9.	(c)	1	1
10.	(d)	1	1
11.	(b)	1	1
12.	(b)	1	1
13.	(b)	1	1
14.	(c)	1	1
15.	(d)	1	1
16.	(d)	1	1
17.	(d)	1	1
18.	(a)	1	1
19.	(c)	1	1
20.	(a)	1	1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

	HCl is oxidised to Cl_2 MnO_2 is reduced to $MnCl_2$	½ ½	2
22.	(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)** **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.	1,1 2	2
23.	Salivary amylase / Ptyalin – Enzyme. Salivary gland The breakdown of starch into sugar will not take place.	½ ½ 1	2
24.	• Current becomes one fourth of its original value. •According to the Ohm's law – potential difference is directly proportional to the current flowing through the conductor provided temperature remains constant. / V ∝ I (Temperature remaining constant for a given conductor)	1 1	2
25.	(a) Medium B In medium B ray of light bends towards normal / ∠ r < ∠ i (b) Refractive index of Medium ′B′ with respect of Medium ′A′ is $n_{BA} = \frac{v_a}{v_b}$ **OR**	½ ½ 1	

	(a)  **(Credit marks for ∠ i , ∠ r and arrows.)** (b) $n_{21} = \frac{n_{2a}}{n_{1a}}$ $\frac{1 \cdot 33}{2 \cdot 42}$ or 0·55	1 ½ ½	2
26.	(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. **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**  	1 1	

	All the physical quantities mentioned in the diagram are mutually perpendicular to each other.		2
	SECTION- C		
27.	• 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
28.	(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
29.	(a) •Adrenal gland ; Adrenaline hormone • Response- • Heart beats faster resulting in supply of more oxygen to muscles • Breathing rate increases • Blood supply to digestive system and skin gets reduced. • Blood supply diverted to skeletal muscles. **(any two)** **OR** (b) (i) A - Sensory neuron B -Relay Neuron C- Effector organ/Muscle (ii) A- Carries impulse from receptor to spinal cord C- Responds to stimulus (iii) The thinking process of the brain is not fast enough / Reflex arcs are more efficient in functioning in the absence of true thought processes	½ , ½ 1 , 1 ½ ½ ½ ½ ½ ½	3

30.	(a) $CaO + H_2O \rightarrow Ca(OH)_2$ + Heat (or any other reaction showing release or absorption of heat) (b) $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2(g)\uparrow$ **(or any other)** (c) $CuSO_4.5H_2O \xrightarrow{heat} CuSO_4 + 5H_2O$ (Blue) (White) **(or any other)**	1 1 1	3
31.	• excessive curvature of the eye lens • elongation of the eyeball (a)  (b) Myopic Eye (b)  (c) Correction for myopia	½ ½ 1 1	3
32.	• 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
33.	(a) (i) 1% (ii) 10% energy (b) Every step of a food chain where transfer of energy occurs.	½ ½ 1	

	Since the amount and available energy keeps on becoming less as we move to higher trophic level, very little usable energy remains after four trophic levels.	1	3
	SECTION -D		
34.	(a) (i) A = CH_3COOH / (Ethanoic acid) / Acetic acid	½	
	Nature = acidic	½	
	Functional group = – COOH / (carboxylic acid)	½	
	$CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$	1	
	(ii) (1) B – Ethanol / Ethyl alcohol / C_2H_5OH	½	
	C – Ester / Ethyl ethanoate / Ethyl acetate	½	
	(2) Acid acts as a Catalyst in this reaction	½	
	(3) $CH_3COOH + C_2H_5OH \xrightarrow{\text{acid}} CH_3COOC_2H_5 + H_2O$	1	
	OR		
	(b) (i) Ethene/C_2H_4	½	
		1	
	• As a dehydrating agent	½	
	(ii) • The process in which unsaturated hydrocarbons/compounds react with hydrogen in the presence of a catalyst (Ni / Pd) to give saturated hydrocarbon.	1	
		1	
	Used in the hydrogenation of vegetable oils which are converted into fats with saturated carbon chains.	1	5
35.	(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.	1	
	(b) In the absence of pollination no male gametes will be available for fertilisation.	1	
	(c) Because in many multi cellular organisms specialised cells are organised into tissues, tissues form organ occupying definite positions in the body.	1	

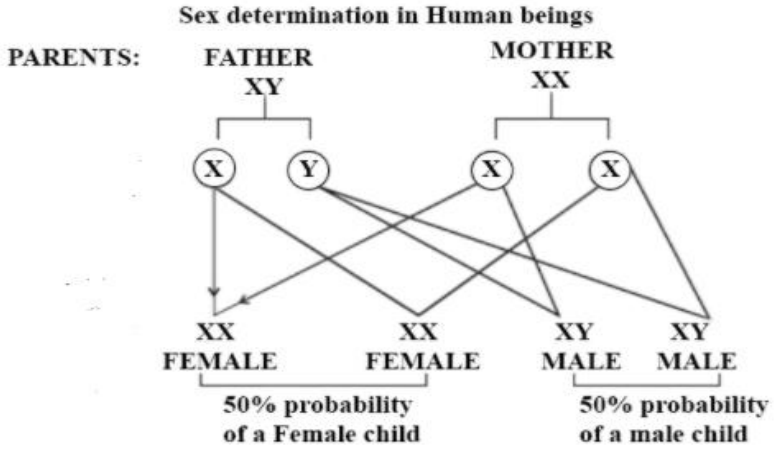
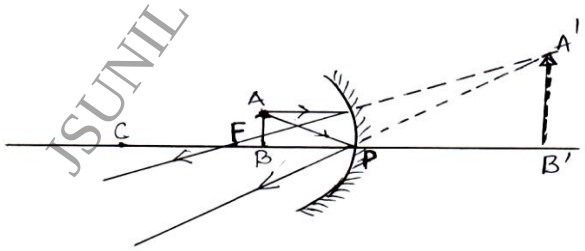
	(d) 1. Plants can bear flowers and fruits earlier than those produced from seeds. 2. It enables the propagation of plants such as banana, orange, rose and jasmine which have lost the capacity to produce seeds. 3. The plants produced are genetically similar enough to the parent plant to have all the characteristics **(any one point)**	½ , ½	
	(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	5
36.	(a) (i) The property of conductor to resist the flow of charges through it.	1	
	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** $1\Omega = \frac{1 \text{ volt}}{1 \text{ ampere}}$	1	
	(ii) • Length of the conductor • Area of cross-section of the conductor • Nature of the material • Temperature **(any two)**	½ + ½	
	(iii) (1) The resistance will become one half of its original value. $R = \rho \frac{l}{A} = \rho \frac{l}{\pi r^2}$	½	
	$R' = \frac{\rho . 2L}{\pi (2r)^2}$	1	
	(2) $R' = \frac{\rho . l}{\pi (2r)^2} . \frac{2}{4} = \frac{R}{2}$	½	
	Resistance will reduce to one half. **OR**		
	(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.	1 1	

	• 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	5
	SECTION- E		
37.	(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)	1 1 1 ½ ½	4

Roasting	**Calcination**
A process in which sulphide ores are converted into oxides by heating strongly in the presence of excess air $2ZnS + 3O_2 \xrightarrow{heat} 2ZnO + 2SO_2$	A process in which carbonate ores are heated in limited supply air. $ZnCO_3 \xrightarrow{heat} ZnO + CO_2$ **(or any other)**

2

38.	(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.	2 2	4
39.	(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. (c) Dentists use concave mirrors Because concave mirror forms erect and enlarged image when object is very close to the mirror. **OR** (c) Case III  **(Deduct ½ mark if direction of ray is not marked.)**	½ , ½ ½ ½ 1 1 1 1	4

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