



BK BIRLA CENTRE FOR EDUCATION
SARALA BIRLA GROUP OF SCHOOL
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL
PRE-BOARD-III 2024-25
SCIENCE (086)



Class: X

Duration: 3 Hr.

Date: 25/01/2025

Max. Marks: 80

General Instructions:

1. All questions are compulsory. However, an internal choice of approximately 33% is provided. 50% of marks are allotted to competency-based questions.
2. Section A has 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B has 6 Short Answer (SA) type questions carrying 02 marks each.
4. Section C has 7 Short Answer (SA) type questions carrying 03 marks each.
5. Section D has 3 Long Answer (LA) type questions carrying 05 marks each.
6. Section E has 3 source-based/case-based/passage-based/integrated units of assessment (04 marks each)

SECTION A

Questions 1 to 16 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

- 1 For a convex mirror the image distance (v) = 5 cm, focal length (f) = 10 cm and height of the image (h_i) = 7.5 cm. The correct representation according to sign conventions is: 1
A. $v = -5$ cm, $f = -10$ cm and $h_i = -7.5$ cm
B. $v = -5$ cm, $f = +10$ cm and $h_i = -7.5$ cm
C. $v = +5$ cm, $f = -10$ cm and $h_i = +7.5$ cm
D. $v = +5$ cm, $f = +10$ cm and $h_i = +7.5$ cm
- 2 What type of image is formed by the eye lens on the retina? 1
A. Real and erect B. Virtual and inverted
C. Real and inverted D. Virtual and erect
- 3 Which of the following describes the common domestic power supplied in India? 1
A. 220V, 100 Hz B. 110 V, 100 Hz
C. 220 V, 50 Hz D. 110 V, 50 Hz
- 4 Which of the following statement(s) about the given reaction are correct? 1
 $3\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$
1. Iron is oxidised
2. Water is oxidised
3. Water is a reducing agent
4. Water is oxidising agent
A. 1 and 4 B. 2 and 3 C. 1 and 3 D. 1 only
- 5 Solid calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by liberation of heat. This process is called slaking of lime. Calcium hydroxide dissolves in water to form its solution called lime water. Which among the following is (are) true about slaking of lime and the solution formed? 1
(i) It is an endothermic reaction
(ii) It is an exothermic reaction
(iii) The pH of the resulting solution will be more than seven
(iv) The pH of the resulting solution will be less than seven.
A. (i) and (ii) B. (ii) and (iii)
C. (i) and (iv) D. (iii) and (iv)

- 6 How many water molecules does hydrated calcium sulphate contain? 1
 A. 5 B. 10 C. 7 D. 2
- 7 In terms of acidic strength, which one of the following is in the correct increasing order? 1
 A. Water < Acetic acid < Hydrochloric acid
 B. Water < Hydrochloric acid < Acetic acid
 C. Acetic acid < Water < Hydrochloric acid
 D. Hydrochloric acid < Water < Acetic acid
- 8 The electronic configurations of three elements X, Y and Z are X — 2, 8; Y — 2, 8, 7 and Z — 2, 8, 2. Which 'of the following is correct? 1
 A. X is a metal
 B. Y is a metal
 C. Z is a non-metal
 D. Y is a non-metal and Z is a metal
- 9 Copper objects lose their shine and form green coating of 1
 A. Copper oxide B. Copper hydroxide and Copper oxide
 C. Basic Copper carbonate D. Copper carbonate
- 10 Oils on treating with hydrogen in the presence of palladium or nickel catalyst form fats. This is an example of 1
 A. Addition reaction B. Substitution reaction
 C. Displacement reaction D. Oxidation reaction
- 11 Correlate the structure with appropriate function: 1
- | Column A | Column B |
|----------------------|---------------------|
| (i) Glomerulus | (1) Expels urine |
| (ii) Ureter | (2) Carries urine |
| (iii) Urethra | (3) Stores urine |
| (iv) Urinary bladder | (4) Ultrafiltration |
- A. (i) (2), (ii) (3), (iii) (1), (iv) (4)
 B. (i) (4), (ii) (3), (iii) (1), (iv) (4)
 C. (i) (4), (ii) (2), (iii) (1), (iv) (3)
 D. (i) (1), (ii) (3), (iii) (2), (iv) (4)
- 12 Which among the following is not the function of testes at puberty? 1
 (i) Formation of germ cells
 (ii) Secretion of testosterone
 (iii) Development of placenta
 (iv) Secretion of estrogen
 A. (i) and (ii) B. (ii) and (iii)
 C. (iii) and (iv) D. (i) and (iv)
- 13 Some methods of birth control are listed. 1
 1. Tubectomy 2. Condom 3. Intra-Uterine devive 4. Oral pill
 Which methods limit the spread of sexually transmitted diseases?
 A. 1 and 2 only
 B. 2 and 3 only
 C. 2 only
 D. 3 only
- 14 A zygote which has an X-chromosome inherited from the father will develop into a 1
 A. boy
 B. girl
 C. X- chromosome does not determine the sex of a child
 D. either boy or girl
- 15 The gap between two neurons is called a: 1
 A. dendrite B. synapse C. axon D. impulse

- 16 If the grasshopper is eaten by a snake, the energy transfer is from 1
 A. Producer to decomposer
 B. Producer to primary consumer
 C. Primary consumer to secondary consumer
 D. Secondary consumer to primary consumer

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R).

Answer these questions by selecting the appropriate option given below:

Both A and R are true, and R is the correct explanation of A.

Both A and R are true, and R is not the correct explanation of A.

A is true but R is false.

A is false but R is true

- 17 Assertion (A): A rainbow is sometimes seen in the sky in the rainy season only when 1
 observer's back is towards the Sun.

Reason (R): Internal reflection in the water droplets cause dispersion and the final rays are in backward direction.

- 18 Assertion (A): Highly reactive metals are obtained by electrolytic reduction. 1

Reason (R): In the electrolytic reduction, metal is deposited at the cathode.

- 19 Assertion: The accumulation of lactic acid in the muscles causes muscle cramps. 1

Reason: During vigorous physical exercise leg muscles respire anaerobically.

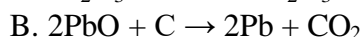
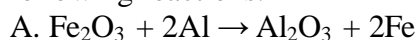
- 20 Assertion: The second trophic level of a food chain in a grassland ecosystem is mostly 1
 occupied by a carnivore.

Reason: Carnivores feed upon herbivores and are secondary consumers.

Section-B

Questions No. 21 to 26 are very short answer questions

- 21 Identify the substances that are oxidised and the substances that are reduced in the 2
 following reactions.



- 22 A person suffering from liver disease is advised to avoid fatty and highly acidic foods. 2
 Give a reason why each of the foods mentioned should be avoided by a person suffering from liver disease.

- 23 Attempt either option A or B. 2

A. i) How does blood sugar level get regulated in the human body?

ii) Name the gland that secretes the hormone.

OR

B. (i) Which hormone is secreted into the blood when you are under stress? Name the gland that secretes this hormone.

(ii) How does it help the body to cope up in an emergency situation?

- 24 Table shows the refractive index of mediums air, diamond and glass. 2

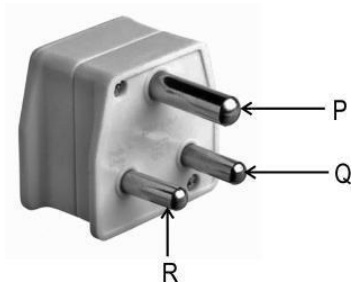
medium	refractive index n
Air	1.33
diamond	2.42
Glass	1.50

A. Explain what is meant by the term refractive index.

B. State and explain in which medium the speed of light is slowest.

- 25 Attempt either option A or B. 2

A. Sunita had to replace the electrical plug of her clothes iron. She bought a three-pin plug as shown below.



When she removed the old plug, she saw that there were three wires coloured red, black and green.

1. To which pin on the plug should she connect the green wire?
2. To which part of the clothes iron is the green wire connected?
3. State the function of the green wire.

OR

- B. 1. Direct contact between which of the three coloured wires will result in a short circuit?
2. State what happens to the current in the circuit in the case of a short circuit. Give a reason for your answer.

- 26 The results of two experiments to determine the relationships between current, radius and magnetic field strength are shown. 2

Experiment	current in the coil (mA)	magnetic field strength (mT)
1		
coil 1	20	50
coil 2	25	75
coil 3	30	100

Experiment	radius of coil (m)	magnetic field strength (mT)
2		
coil 1	0.10	100
coil 2	0.25	50
coil 3	0.50	20

Describe the relationships.

Section-C

Questions No. 27 to 33 are short answer questions

- 27 2 g of ferrous sulphate crystals are heated in a dry boiling tube.
- (a) List any two observations.
 - (b) Name the type of chemical reaction taking place.
 - (c) Write balanced chemical equation for the reaction and name the products formed.
- 28 Attempt either option A or B.
- A. During electrolysis of brine, a gas 'G' is liberated at anode. When this gas 'G' is passed through slaked lime, a compound 'C' is formed, which is used for disinfecting drinking water.
- (i) Write formula of 'G' and 'C'.
 - (ii) State the chemical equations involved.
 - (iii) What is common name of compound 'C'? Give its chemical name.

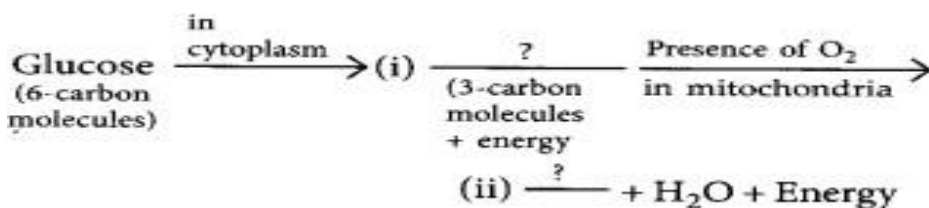
OR

- B. A white coloured powder 'X' is used by doctors for supporting fractured bones.
- (i) Write chemical name and formula of the powder, X.
 - (ii) When this white powder is mixed with water a hard solid mass is obtained. Write balanced chemical equation for this change.
 - (iii) Write any two uses of 'X'

- 29 In the process of respiration, state the function of alveoli. 3
- Rate of breathing in aquatic organisms is much faster than that in terrestrial organisms.

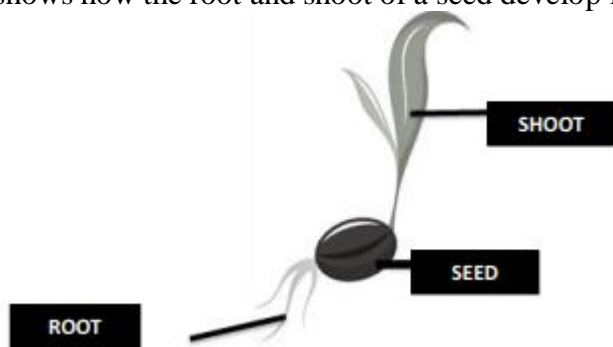
Give reasons.

Complete the following pathway showing the breakdown of glucose.



- 30 Fig. shows how the root and shoot of a seed develop in response to stimuli.

3



(i) State the name of the plant hormone that causes the root and shoot to develop in the way shown in Fig.

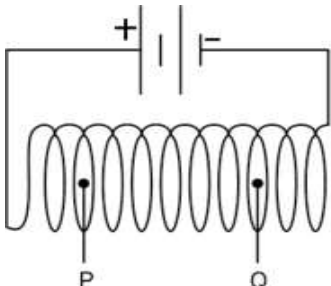
(ii) Identify the stimulus that causes the roots to grow in the direction shown in Fig. State the name of this response.

(iii) Explain how the plant hormone controls the growth response of the shoot.

- 31 State the function of each of the following parts of the human eye :

(i) Cornea (ii) Pupil (iii) Retina

- 32 A helical coil whose length is greater than its diameter is connected to a battery as shown below.



(i) How does the magnetic field at point P compare with the magnetic field at point Q? Justify your answer.

(ii) State one way in which the strength of the magnetic field inside a current carrying helical coil can be changed?

(iii) State the rule to determine the direction of the force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it.

- 33 In the following food chain, plants provide 500 J of energy to rats. How much energy will be available to hawks from snakes?

Plants → Rats → Snakes → Hawks

b) What is ozone layer and how it is getting depleted?

Section D

Question No. 34 to 36 are long answer questions.

- 34 Attempt either option A or B.

A. A compound C (molecular formula, $\text{C}_2\text{H}_4\text{O}_2$) reacts with Na - metal to form a compound R and evolves a gas which burns with a pop sound. Compound C on treatment with an alcohol A in presence of an acid forms a sweet-smelling compound S (molecular formula, $\text{C}_3\text{H}_6\text{O}_2$). On addition of NaOH to C, it also gives R and water. S on treatment with NaOH solution gives back R and A.

Identify C, R, A, S and write down the reactions involved. Give any two uses of esters.

OR

B. An organic compound 'X' is a liquid at room temperature. It is also a very good solvent and has the molecular formula C_2H_6O . Upon oxidation 'X' gives 'Y'. 'Y' releases a gas 'W' with brisk effervescence on reacting with $NaHCO_3$. X reacts with Y in the presence of conc. H_2SO_4 to give another compound 'Z' which has a pleasant smell.

- Give the chemical name and chemical formula of Y.
- How will you test for the gas 'W'?
- Depict the formation Y and Z using chemical equations.
- Name the reaction of formation of 'Z'. Give any one use of 'Z'?

35 Attempt either option A or B.

A. (i) Distinguish between pollination and fertilisation. Mention the site and product of fertilisation in a flower.

(ii) Draw a neat, labelled diagram of a pistil showing pollen tube growth and its entry into the ovule.

OR

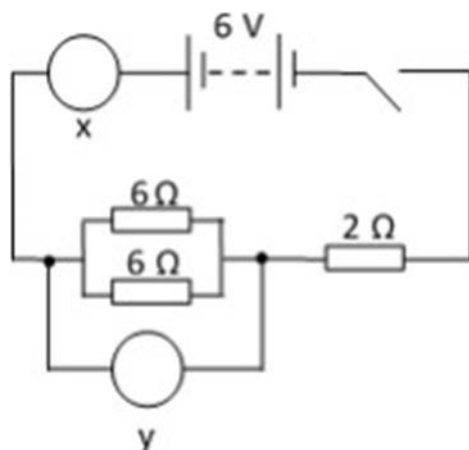
B. (i) Trace the path of sperm during ejaculation and mention the gland and their functions associated with the male reproductive system.

(ii) What changes are observed in the uterus if fertilisation does not occur?

(iii) What changes are observed in the uterus subsequent to implantation of young embryo?

36 Attempt either option A or B.

The circuit in Fig. 1.1 has resistors in series and parallel.



(i) State two factors that affect the resistance of a resistor.

(ii) X and Y are meters.

Identify X and Y and the electrical property that each meter measures.

(iii) Calculate the equivalent resistance in the circuit

(iv) Using your answer to (iii), calculate the current in the circuit. State the unit

OR

B. In an investigation, the current in a circuit and the potential difference across a resistor in the circuit were measured. The results are shown in the Table.

I (A)	0.5	1	2	3	4
V (V)	1.6	3.4	6.8	10.2	13.2

Plot V I graph and Calculate the resistance of the resistor

SECTION E

37 Attempt either subpart B or C.

In an investigation, metals A, B, C and D are added to different solutions. The

observations are shown in Table;

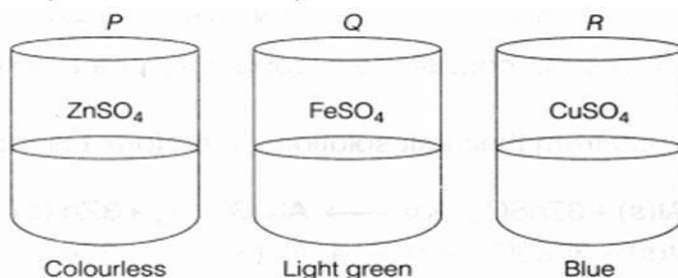
Solutions				
Metal	Iron (II) sulphate	Copper (II) sulphate	Aluminium sulphate	Silver nitrate
A	No reaction	Displacement		
B	Displacement		No reaction	
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

A. Explain what will be observed when metal B is added to copper (II) sulphate solution.

B. Write the metals A, B, C and D in order of least reactive to most reactive.

OR

C. In an investigation, pieces of zinc are added to containers P, Q and R containing zinc sulphate, iron sulphate and copper sulphate.



In which containers will a colour change be observed? Give a reason for your answer.

38

Attempt either subpart A or B.

A. Explain Mendel's experiment with peas on inheritance of character considering only one visible contrasting character.

OR

B. Using a Punnett square, determine the genotype of the parents, if their child can have any of the four blood groups.

C. A plant having red coloured flowers when crossed with the other having the same colour produced 40 progeny out of which 30 plants were with red coloured flowers, 10 plants were with white colour flowers. Find out:

(i) What is possible genotype of parent plants?

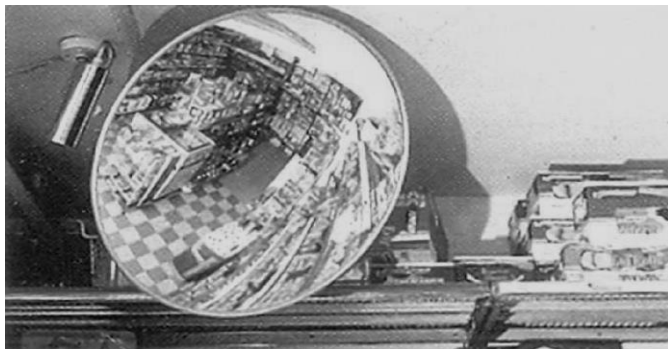
(ii) Which trait is dominant and recessive?

(iii) What is its phenotypic ratio?

39

Attempt either subpart C or D

Rajesh's father Mr. Jayesh runs a cosmetics and perfumes shop in a crowded market place. Mr. Jayesh usually complains at home that there is a lot of 'shop-lifting' in his shop which was causing loss to him. Rajesh used to hear such complaints of his father. One day Rajesh went to the market and purchased one big mirror of a special kind. He then went to his father's shop and fixed the mirror at strategic positions inside the shop as shown in the figure. Mr. Jayesh found that after the installation of the mirror, the shop-lifting almost stopped. He was very happy and thanked Rajesh for making this possible.



A. What type of mirror was fixed by Rajesh in the shop?

B. Place three ticks in the table for image formed by such mirror due to which it helps in preventing shop-lifting.

Diminished	
Inverted	
Real	
Enlarged	
Same size	
Upright	
Virtual	

C. What special name/names is/are given to such mirror which help in preventing shop-lifting?

- a) Concave mirror b) vigilance mirror
 c) plane mirror d) security mirror

i) a only

ii) b and c both

iii) b and d both

iv) c and d both OR

D. After few days that mirror becomes dirty. During cleaning, Rajesh held the mirror inside the water. So, what should be the change in the focal length of the mirror?

a) increases

b) decreases

c) no change

d) none of the above

*****Best of Luck*****