



# COMMON PRE-BOARD EXAMINATION 2023-24

Subject: SCIENCE (086)

Class X



Time: 3 Hrs.

Max. Marks: 80

## **General Instructions:**

Read the following instructions carefully:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

## **SECTION - A**

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

- 1 Which of the following statements about the given reaction are correct? 1  
$$2\text{Al (s)} + 3\text{H}_2\text{O (g)} \rightarrow \text{Al}_2\text{O}_3 \text{ (s)} + 3\text{H}_2 \text{ (g)}$$

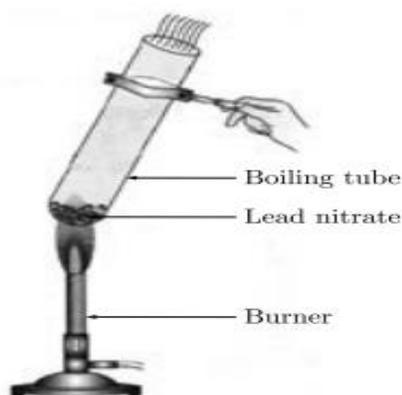
(i) Aluminium is getting oxidised  
(ii) Water is getting reduced  
(iii) Water is acting as reducing agent  
(iv) Water is acting as oxidising agent

(a) (i), (ii) and (iii)      (b) (iii) and (iv)      (c) (i), (ii) and (iv)      (d) (ii) and (iv)
- 2 Brine is an 1  

(a) aqueous solution of sodium hydroxide  
(b) aqueous solution of sodium chloride  
(c) aqueous solution of sodium carbonate  
(d) aqueous solution of sodium bicarbonate

3 When lead nitrate crystals are heated as shown in the figure:

1



- (a) a brown gas is evolved and a white residue is left behind
- (b) a colourless gas is evolved and a yellow residue is left behind
- (c) a brown gas is evolved, and a yellow residue is left behind.
- (d) a greenish yellow gas is evolved and a brown residue is left behind

4 Copper objects lose their shine when exposed to air and form a green coating of

1

- (a) Copper oxide
- (b) Copper hydroxide and Copper oxide
- (c) Copper carbonate
- (d) Basic Copper carbonate

5 Study the following table and choose the correct option.

1

	Salt	Parent acid	Parent base	Nature of salt
I	Sodium Chloride	HCl	NaOH	Basic
II	Sodium Carbonate	H <sub>2</sub> CO <sub>3</sub>	NaOH	Neutral
III	Sodium Sulphate	H <sub>2</sub> SO <sub>4</sub>	NaOH	Acidic
IV	Sodium Acetate	CH <sub>3</sub> COOH	NaOH	Basic

- (a) I                      (b) II                      (c) III                      (d) IV

6 The colour of the solution observed after 30 minutes of placing silver metal to copper sulphate solution is

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- (a) Blue                      (b) Colourless                      (c) Grey                      (d) Pale green

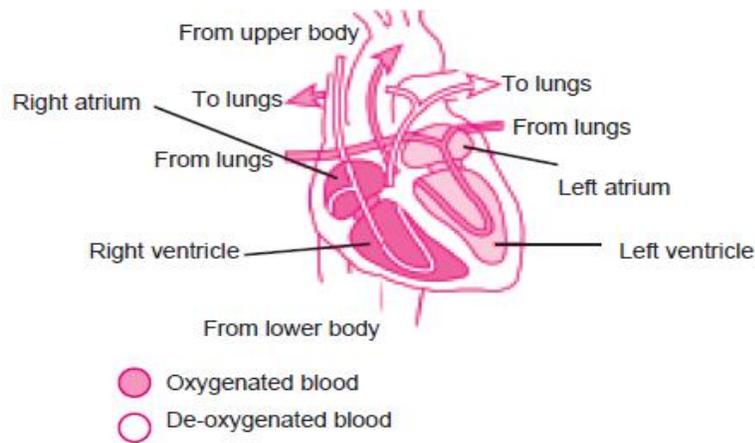
7 An element X has electronic configuration 2, 8, 1 and another element Y has electronic configuration 2, 8, 7. They form a compound Z. The property that is not exhibited by Z is

1

- (a) It has high melting point.
- (b) It is a good conductor of electricity in its pure solid state.
- (c) It breaks into pieces when beaten with hammer.
- (d) It is soluble in water

8 The image shows oxygenated and de-oxygenated blood in the human heart.

1



What is the direction of deoxygenated blood from the right ventricle of the heart?

- (a) towards the lungs.
- (b) towards the left atrium of the heart.
- (c) towards the upper body.
- (d) towards the lower body.

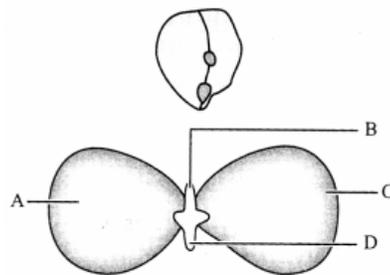
9 In the given food chain, suppose the amount of energy at the fourth trophic level is 5 kJ, what will be the energy available at the producer level?  
Grass → Grasshopper → Frog → Snake → Hawk

1

- (a) 5 kJ
- (b) 50 kJ
- (c) 500 kJ
- (d) 5000 kJ

10 Study the figure below and identify the row containing incorrect information.

1



Part Name	Function
(a) A is Cotyledon	It is the future plant
(b) B is Plumule	It is the future shoot
(c) C is Seed coat	It is the outer covering of the ovule
(d) D is Radicle	It is the future root

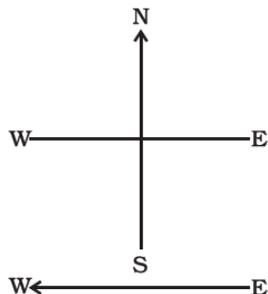
11 The Genotype of offspring formed from Tt x tt will be-

1

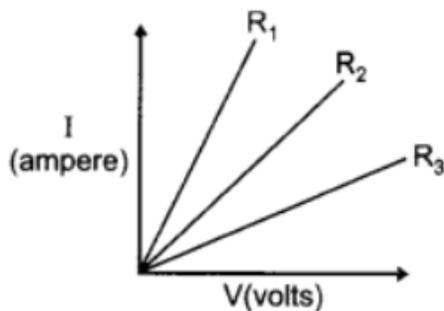
- (a) TT and tt
- (b) Tt and tt
- (c) only tt
- (d) only TT

- 12 Which part of nephron allows the selective reabsorption of useful substances like glucose, amino acids, salts and water into the blood capillaries? 1  
 (a) Tubule (b) Glomerulus (c) Bowman's capsule (d) Ureter

- 13 A constant current flows in a horizontal wire in the plane of the paper from east to west as shown in the given figure. The direction of magnetic field at a point will be North to South when the point is 1



- (a) directly above the wire  
 (b) directly below the wire  
 (c) at a point located in the plane of the paper, on the north side of the wire  
 (d) at a point located in the plane of the paper, on the south side of the wire
- 14 A student carries out an experiment and plots the V-I graph of three samples of nichrome wire with resistances  $R_1$ ,  $R_2$  and  $R_3$  respectively. Which of the following is true? 1



- (a)  $R_1 = R_2 = R_3$  (b)  $R_1 > R_2 > R_3$  (c)  $R_3 > R_2 > R_1$  (d)  $R_2 > R_3 > R_1$
- 15 One cell-thick vessels are called 1  
 Arteries (b) Veins (c) Capillaries (d) Pulmonary artery
- 16 What will happen if all the deer are killed in the given food chain? 1

Grass  $\rightarrow$  Deer  $\rightarrow$  Lion

- (a) The population of grass decreases.  
 (b) The population of lions increases.  
 (c) The population of lions remains unchanged.  
 (d) The population of lions decreases and grass increases.

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

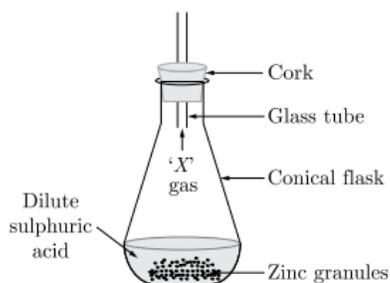
- a) Both A and R are true, and R is the correct explanation of A.
- b) Both A and R are true, and R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

- 17 **Assertion (A):** Solder is an alloy of lead and zinc. 1  
**Reason (R):** It is used for welding electric wires together.
- 18 **Assertion (A):** In human male, testes are extra abdominal organs which are present inside scrotum. 1  
**Reason (R):** Scrotum has a relatively lower temperature needed for the production and storage of sperms.
- 19 **Assertion(A) :** A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the magnitude of an electric current in the wire is increased. 1  
**Reason (R):** Strength of a magnetic field at a point near the conductor increases on increasing the current.
- 20 **Assertion (A):** Ozone is both beneficial and damaging. 1  
**Reason (R):** Stop the release of chlorofluorocarbons to protect the ozone.

### SECTION – B

Q. no. 21 to 26 are very short answer questions.

- 21 Observe the given figure and answer the questions that follow: 2



- i) Identify the gas X .
  - ii) Write the chemical reaction involved.
  - iii) Is it an exothermic reaction or an endothermic reaction?
  - iv) Identify the type of reaction.
- 22 How do Leishmania and Plasmodium reproduce, and mention the difference in their modes of reproduction? 2
- 23 List out any four different strategies used by plants for excretion. 2

OR

How is the amount of urine produced regulated?

- 24 Why do stars appear to twinkle? Explain. 2

- 25 a) With the help of a ray diagram state what is meant by refraction of light. 2  
b) The refractive index of water with respect to air is  $\frac{4}{3}$ . Find the speed of light in water.

**OR**

- a) Define the S.I unit of power of a lens.  
b) A convex lens has a focal length of 25 cm. Calculate the power of the given lens.
- 26 (a) From the following group of organisms create a food chain which is most advantageous for human beings in terms of energy. 2  
Hawk, Rat, Cereal plant, Goat, Snake, Human being  
(b) What is the possible disadvantage of the cereal plant which is growing in soil rich in pesticides?

### **SECTION - C**

Q.no. 27 to 33 are short answer questions.

- 27 Give reason for the following: 3  
(i) Hydrogen gas is not evolved when most of the metals react with nitric acid.  
(ii) Zinc oxide is considered as an amphoteric oxide.  
(iii) Ionic compounds have high melting and boiling points.
- 28 A student dropped a few pieces of marble in dilute hydrochloric acid, contained in a test tube. The evolved gas was then passed through lime water. What change would be observed in lime water? What will happen if excess gas is passed through lime water? Write balanced chemical equations for all the changes observed. 3

**OR**

Mrs. Rema uses a compound of sodium X to make pakoras crispy. It is a mild non-corrosive salt, also used as an ingredient in antacids.

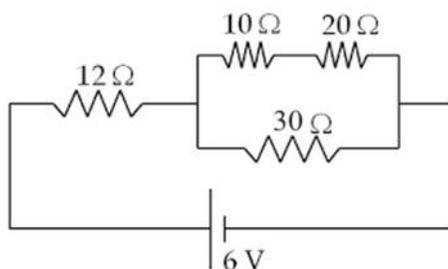
- (i) Identify the compound X. Is the pH value of the solution of X lower or higher than 7?  
(ii) Write the chemical reaction involved when X is heated.  
(iii) State the reason why it is used as an ingredient in antacid.
- 29 A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other. 3  
(a) List your observations regarding:  
(i) Colour of stem in their F1 progeny  
(ii) Percentage of brown stemmed plants in F2 progeny if plants are self-pollinated.  
(iii) Ratio of GG and Gg in the F2 progeny.  
(b) Based on the findings of this cross, what conclusion can be drawn?
- 30 (a) Draw a neat diagram of a neuron and label 3  
(i) where information is acquired  
(ii) through which information travels as an electric impulse.  
(b) Which part of the human brain is:  
(i) the main thinking part of the brain?

(ii) responsible for maintaining the posture and balance of the body?

(c) State the function of the plant hormone Cytokinin.

31 Observe the given circuit diagram and answer the following questions.

3



- What is the effective resistance of the circuit?
- How much current will flow through it?

32 A student is unable to see clearly the words written on the blackboard placed at a distance of approximately 3 m from him.

3

- Name the defect of vision the boy is suffering from.
- State the possible causes of this defect.
- Draw a ray diagram to show how this defect can be corrected using a suitable lens.

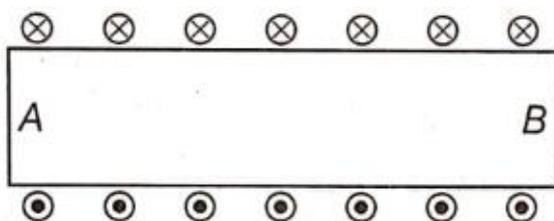
**OR**

A person cannot read newspaper placed nearer than 50 cm from his eyes.

- Name the defect of vision he is suffering from.
- Draw a ray diagram to illustrate this defect.
- List its two possible causes.

33 Diagram shows the lengthwise section of a current carrying solenoid.  $\otimes$  indicates current entering into the page,  $\odot$  indicates current emerging out of the page.

3



- Decide which end of the solenoid A or B, will behave as North Pole. Give reason for your answer.
- Draw magnetic field lines inside and around the solenoid.
- Mention any one method to increase the strength of the magnetic field due to a solenoid.

### SECTION - D

Q.no. 34 to 36 are long answer questions.

34 The formulae of four organic compounds are given below:

5

A	B	C	D
$C_2H_4$	$CH_3COOH$	$C_2H_5OH$	$C_2H_6$

- (i) Which one of these compounds A, B, C or D is a saturated hydrocarbon?
- (ii) Identify the organic acid and give its structural formula.
- (iii) Which of the above compounds when heated at 443K in the presence of concentrated  $\text{H}_2\text{SO}_4$  forms ethene as the major product? Write the chemical equation involved.
- (iv) Give a chemical equation when B and C react with each other in presence of concentrated  $\text{H}_2\text{SO}_4$ . Name the major product formed and mention one of its important uses.

**OR**

- (a) What is meant by isomers? Draw all possible isomers of butane.
- (b) "A compound 'X' on combustion gives a yellow flame with lots of smoke." What inference would you draw from this statement?
- (c) State the role of alkaline  $\text{KMnO}_4$  in the reaction involving conversion of an alcohol to corresponding carboxylic acid. Illustrate the reaction with the help of a suitable chemical equation.

- 35 (a) In the female reproductive system of human beings, state the functions of: 5
- (i) Ovary
  - (ii) Oviduct.
- (b) Mention the changes that the uterus undergoes, when
- (i) it has to receive a zygote.
  - (ii) no fertilisation takes place.
- (c) State the functions of placenta.

**OR**

- (a) Draw a neat diagram showing fertilisation in a flower and label (i) pollen tube and (ii) Male germ cell.
- (b) Explain the process of fertilisation in a flower.
- (c) What happens to the (i) ovary and (ii) ovule after fertilisation?

- 36 a) At what distance from a concave lens of focal length 25 cm a 10 cm tall object be placed so as to obtain its image at 20 cm from the lens. 5
- b) Calculate the size of the image formed.
- c) Draw a ray diagram to justify your answer for the above situation and label it.

**OR**

- a) Calculate the magnification of the image of an object placed perpendicular to the principal axis of a concave mirror of focal length 15 cm. The object is at a distance of 20 cm from the mirror.
- b) Draw a ray diagram to support your answer.

## 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 An organic compound A of molecular formula  $C_2H_4$  on reduction gives another compound B of molecular formula  $C_2H_6$ . B on reaction with chlorine in the presence of sunlight gives C of molecular formula  $C_2H_5Cl$ . 4

- Name the compounds A and B.
- Draw the electron dot structure of A.
- Write the chemical equation for the conversion of A to B and state the condition required for the reaction.

OR

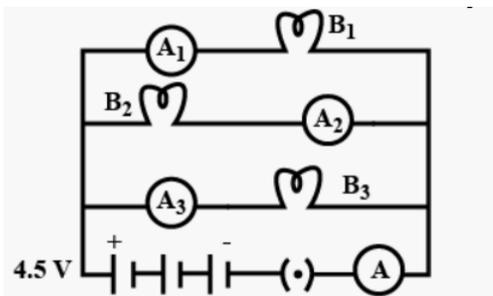
- Name the chemical reaction which occur in the conversion of B to C and also write the chemical equation.

38 When electric current flows through the circuit this electrical energy is used in two ways, some part is used for doing work and the remaining may be expended in the form of heat. We can see, in mixers after using it for long time it becomes hotter, fans also become hot after continuous use. This type of effect of electric current is called the heating effect of electric current. If I is the current flowing through the circuit then the amount of heat dissipated in that resistor will be  $H = I^2Rt$ . 4

- If a bulb is working at a voltage of 200V and the current is 1A then what is the power of the bulb?
- Two bulbs A and B are marked as 'A' 60W, 220V & 'B' 100W, 220V are connected in parallel to 220 V source. Which of the two will glow brighter? Why?
- How much current will an electric iron draw from a 220 V source if the resistance of its element when hot is 55 ohms?
  - What determines the rate at which energy is delivered by a current?

OR

- $B_1$ ,  $B_2$  and  $B_3$  are three identical bulbs connected as shown in figure. When all the three bulbs glow, a current of 3A is recorded by the ammeter.



- What happens to the glow of the other two bulbs when bulb  $B_1$  gets fused?
- What will change do you expect in the reading of  $A_1$ ,  $A_2$  and  $A_3$  when bulb  $B_2$  gets fused?

39 Pea plants can have smooth seeds or wrinkled seeds. One of the phenotypes is completely dominant over the other. A farmer decides to pollinate one flower of a plant 4

with smooth seeds using pollen from plant with wrinkled seeds. The resulting pea pod has all smooth seeds.

- i. Which of the following conclusions can be drawn?
  - (1) The allele for smooth seeds is dominated over that of wrinkled seeds.
  - (2) The plant with smooth seeds is heterozygous.
  - (3) The plant with wrinkled seeds is homozygous.
    - (a) 1 only
    - (b) 1 and 2 only
    - (c) 1 and 3 only
    - (d) 1, 2 and 3
- ii. Which crosses will give smooth and wrinkled seeds in the same proportion?
- iii. Which cross can be used to determine the genotype of a plant with a dominant phenotype?
- iv. On crossing of two heterozygous smooth seeded plants (Rr), a total of 1000 plants were obtained in F1 generation. What will be the respective number of smooth and wrinkled seeds obtained in F1 generation?

**OR**

- iv. The characters which appear in the first filial generation are called