

Roll No.

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Candidates must write the Code on the title page of the answer book.

- Please check that this question paper contains **14** printed pages.
- Code number 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 before attempting it.**
- 15 minutes time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

**II PRE-BOARD EXAMINATION : 2023-24**  
**CLASS : X**  
**SCIENCE [086]**

*Time Allowed : 3 hours*

*Maximum Marks : 80*

**General Instructions :**

- i) This question paper consists of 39 questions in 5 sections.*
- ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
- iii) Section A consists of 20 objective type questions carrying 1 mark each.*
- iv) 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.*

- v) 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.
- vi) Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
- vii) Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

### SECTION - A

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

1. What is the product formed when calcium oxide (CaO) reacts with water (H<sub>2</sub>O)? 1
- a) Calcium hydroxide
  - b) Calcium chloride
  - c) Calcium carbonate
  - d) Calcium sulphate
2. Which gas is evolved when sodium bicarbonate (baking soda) is heated? 1
- a) Oxygen
  - b) CO<sub>2</sub>
  - c) Hydrogen
  - d) Nitrogen
3. Which of the following is a decomposition reaction? 1
- a)  $2\text{H}_2 + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}$
  - b)  $2\text{KClO}_3 \longrightarrow 2\text{KCl} + 3\text{O}_2$
  - c)  $\text{CH}_4 + 2\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
  - d)  $2\text{Na} + \text{Cl}_2 \longrightarrow 2\text{NaCl}$

4. Which of the following is an example of a weak base ?
- a) Sodium hydroxide
  - b) Potassium hydroxide
  - c) Ammonium hydroxide
  - d) Calcium hydroxide
5. The poorest conductor of heat among metals is :
- a) Lead
  - b) Silver
  - c) Calcium
  - d) Sodium
6. Which of the following pairs will give displacement reactions ?
- a)  $\text{FeSO}_4$  solution and copper metal
  - b)  $\text{AgNO}_3$  solution and copper metal
  - c)  $\text{CuSO}_4$  solution and silver metal
  - d)  $\text{NaCl}$  solution and copper metal
7. What is the formula of butanoic acid ?
- a)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$
  - b)  $\text{COOH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3$
  - c)  $\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_3 \\ | \\ \text{COOH} \end{array}$
  - d)  $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{COOH}$

1

1

1

8. What is the function of ATP in the transport of food through phloem ? 1
- a) It produces energy for the synthesis of carbohydrates
  - b) It allows water to enter the sieve tubes by osmosis
  - c) It loads food into the sieve tubes
  - d) It creates pressure in the phloem tissue
9. The number of chromosomes in parents and offsprings of a particular species undergoing sexual reproduction remains constant due to : 1
- a) Doubling of chromosomes after zygote formation
  - b) Halving of chromosomes after zygote formation
  - c) Doubling of chromosomes before gamete formation
  - d) Doubling of cromosomes at the time of gamete formation
10. Which of the following groups contain only biodegradable items ? 1
- a) News paper, pesticides, clothes
  - b) Newspaper, books, used clothes
  - c) Detergent, books, leather
  - d) Books, detergent, pesticides
11. Two pink-coloured flowers on crossing resulted in 1 red, 2 pink and 1 white flower progeny. The nature of the cross will be : 1
- a) double fertilization
  - b) self pollination
  - c) cross fertilization
  - d) no fertilization

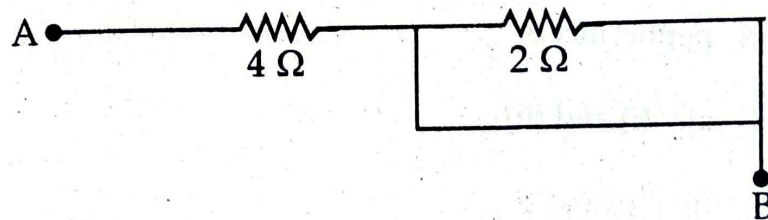
12. A farmer wants to grow banana plants genetically similar enough to the plants already available in his field. Which one of the following methods would you suggest for his purpose ?

1

- a) Regeneration
- b) Budding
- c) Vegetative propagation
- d) Sexual reproduction

13. The equivalent resistance between points 'A' and 'B' in the given circuit is :

- a)  $6 \Omega$
- b)  $4 \Omega$
- c)  $2 \Omega$
- d) None of these



14. Refractive indices of glass, air and water are 1.52, 1.003 and 1.333 respectively.

If  $v_g$ ,  $v_a$  and  $v_w$  are speeds of light in glass, air and water respectively then.

- a)  $v_w > v_a > v_g$
- b)  $v_g > v_w > v_a$
- c)  $v_a > v_w > v_g$
- d)  $v_g > v_a > v_w$

15. Select the mismatched pair in the following :

- a) Biomagnification- Accumulations of chemicals at successive trophic levels
- b) Ecosystem - Biotic components of the environment
- c) Aquarium - A man-made ecosystem
- d) Parasites - organisms which obtain food from other living organism

16. Excessive exposure of humans to U V-rays results in :

- i) damage to immune system
- ii) damage to lungs
- iii) skin cancer
- iv) peptic ulcers

- a) (i) and (ii)
- b) (ii) and (iv)
- c) (i) and (iii)
- d) (iii) and (iv)

Q. no. 17 to 20 are Assertion-Reasoning based questions. These 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):** Silver bromide decomposition is used in black and white photography. 1
- Reason (R) :** Light provides energy for this exothermic reaction.
18. **Assertion (A):** Amoeba reproduces by Binary Fission. 1
- Reason (R) :** All unicellular organisms reproduce asexually.
19. **Assertion (A):** On changing the direction of flow of current through a straight conductor, the direction of a magnetic field around the conductor is reversed. 1
- Reason (R) :** The direction of magnetic field around a current carrying conductor can be given in accordance with left hand thumb rule.
20. **Assertion (A):** Maximum energy is always available at the lowest level in the pyramid. 1
- Reason (R) :** Energy always flow only in one direction from higher level to lower level.

### SECTION B

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

21. Write the chemical formula of the brown gas produced during thermal decomposition of lead nitrate. Also write balanced chemical equation of this reaction. 2
22. MS. Pankaj observed a patch of greenish -black powdery mass on a stale piece of bread : 2
- a) Name the organism responsible for this and its specific mode of asexual reproduction.
- b) Name its vegetative and reproductive parts.

23. What will happen if mucus is not secreted by the gastric glands ?

2

OR

1 ml of dilute starch solution is taken in test tube and 1 ml of Saliva is added to it. After keeping the mixture for an hour, few drops of iodine solutions are added to the test tube. Is there any change in colour of the test tube ? What does this tell you about the action of saliva on starch ?

2

24. The refractive index of a medium 'X' with respect to 'Y' is  $\frac{2}{3}$  and the refractive index of medium 'Y' with respect to 'Z' is  $\frac{4}{3}$ . Calculate the refractive index of medium 'Z' with respect to 'X'. If the speed of light in medium 'X' is  $3 \times 10^8 \text{ ms}^{-1}$ , then calculate the speed of light in medium 'Z'.

2

25. How many 176 ohm resistors (in parallel) are required to carry 5 ampere current when connected to a 220 volt line ?

2

OR

An electron is moving from North to South is deflected towards West by a strong magnetic field. What is the direction of the magnetic field ? Name the rule applied.

26. Plastic cups were used to serve tea in trains in early days. These could be returned to vendor, cleaned and reused. Later on Kulhads were used instead of plastic cups. They were also replaced by paper cups later on. What is the reason to shift plastic cups to kulhads and finally to paper cups ?

2



SECTION - C

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

27. a) Why does calcium start floating when it reacts with water ? Write the balanced chemical equation of the reaction. 3

b) Name two metals which do not react with water.

28. A metal (E) is stored under kerosene oil. When a small piece of it is left open in air, it catches fire. When the product formed is dissolved in water, it turns red litmus blue : 3

i) Name the metal (E).

ii) Write the chemical equation for the reaction when it is exposed to air and when the product is dissolved in water.

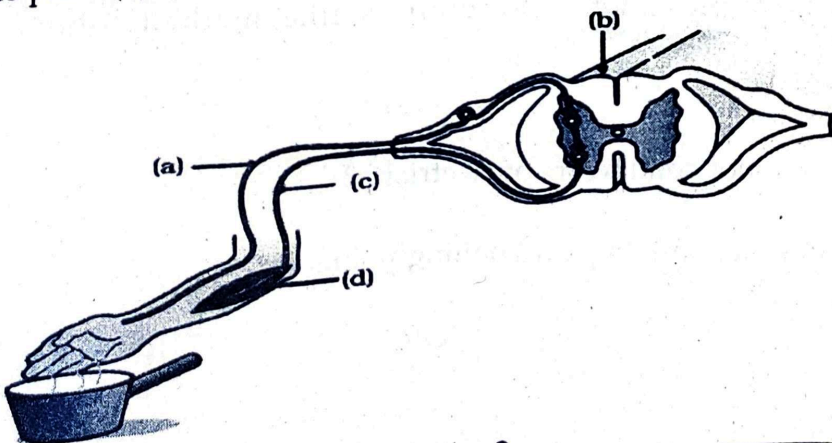
iii) Explain the process by which the metal is obtained from its molten chloride.

OR

i) Show the formation of  $\text{Na}_2\text{O}$  by the transfer of electrons.

ii) What does one mean by exothermic and endothermic reactions ? Give examples.

29. Label the parts (a), (b), (c) and (d) show the direction of flow of electrical signals in figure. 3



30. Do genetic combination of mothers play a significant role in determining the sex of a new born ? Illustrate with the help of diagram. 3
31. The sky appears to be blue however it appears to be black to an astronaut. Explain in detail. 3
32. i) State the characteristics of a heating element. 3  
ii) An electric heater of resistance 8 ohms draws 15 A from the main source in 2 hours. Calculate the rate at which heat is developed in the heater.
33. i) A student sitting in the front row of his class, is unable to see the board clearly. Name the defect. 3  
ii) How is it corrected ?  
iii) A hyper metropic person has a near point of 1 meter. Calculate the power and focal length of the lens required to rectify the defect.

#### SECTION - D

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

34. What is methane ? Draw its electron dot structure. Name the type of bonds present in Methane Explain why compounds like methane show the following characteristics : 5
- i) These are poor conductors of electricity?  
ii) These have low melting and boiling points ?

OR

a) What is the role of conc. sulphuric acid when it is heated with ethanol at 443 K.

Give the reaction involved.

2+3

b) Renu by mistake forget to label the two test tubes containing ethanol and ethanoic acid-suggest an experiment to identify the substances correctly ?

Illustrate the reactions with the help of the chemical equations.

35. a) Distinguish between pollination and fertilisation.

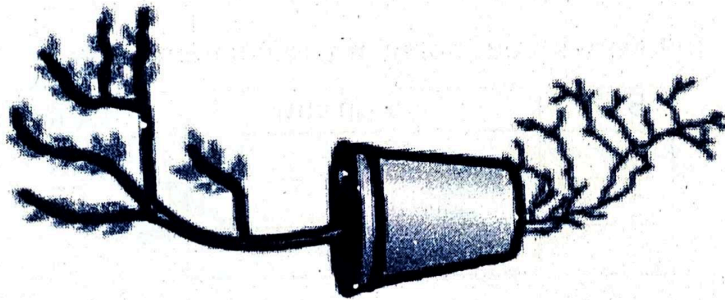
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b) Mention the site and product of fertilisation in a flower.

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

OR

a) MS. Farah kept the potted plant horizontally and let it be like that for 5-6 days as shown in the figure. After that she observed the root and shoot show different movements. Explain.



b) How is this type of movement different from the movement in touch-me-not plant.

c) Mention any two different types of directional movements shown by plants in response to various stimuli.

36. Suppose you have three concave mirrors A, B and C of focal length 10 cm, 15 cm and 20 cm. For each concave mirror you perform the experiment of image formation for three values of object distance of 10 cm, 20 cm and 30 cm. Giving reason, answer the following :

- For the three object distance, identify the mirror/mirrors which will form an image of magnification -1.
- Out of the three mirrors identify the mirror which would be preferred to be used for shaving purposes/makeup.
- For the mirror B, draw ray diagram for image formation for object distances 10 cm and 20 cm.

OR

Analyse the following observation table showing variation of image distance ( $v$ ) with object distance ( $u$ ) in case of a convex lens and answer the questions that follow, with out doing any calculations :

S.No.	$u$ (in cm)	$v$ ( in cm)
1.	- 90	+ 18
2.	- 60	+ 20
3.	- 30	+ 30
4.	- 20	+ 60
5.	- 18	+ 90
6.	- 10	+ 100

- What is the focal length of the convex lens. Give reason in support of your answer.

- b) Write the serial number of the observation which is not correct, giving the reason also.
- c) Draw a ray diagram for the observation at serial number 4 and find approximate value of magnification.

**SECTION -E**

**Q. no. 37 to 39 are case-based / data--based questions.**

37. There are so many important compounds known, which have some characteristic properties, like bleaching powder is used as a disinfectant, plaster of Paris is used for joining fractured bones, Baking powder is used for making dhoklas and baking cake, sodium chloride is used as a table salt etc. These properties make these compounds very useful in our daily routine.

- a) What is the chemical name and chemical formula of baking soda ? 1
- b) Which compound is formed when plaster of Paris combines with water ? 1
- c) Write the reaction of preparation of baking soda using sodium chloride as one of the raw materials. 2

**OR**

d) Write the reaction involved in chlor -alkali process ?

38. The rules for inheritance of such traits in human beings are related to the fact that both the father and the mother contribute practically equal amounts of genetic material to the child. This means that each trait can be influenced by both paternal and maternal DNA. Thus, for each trait there will be two versions in each child. What will, then, the trait seen in the child be ? 4

- 14.
- i) What were the contrasting traits used by Mendel?
  - ii) What was the phenotypic ratio of monohybrid cross?
  - iii) What was the genotypic ratio of monohybrid cross?

**OR**

How do the traits get expressed?

39. In household electric circuits, the mains supply is delivered to our homes using three core cable. The cable consists of three wires; live wire, neutral wire and earth wire. The live wire is at potential of 220 V for the domestic supply and the potential difference between live and neutral wire is 220 volts. The live wire is connected to electric meter through a fuse or a circuit breaker of higher rating. The neutral wire is connected directly to the electric meter.

- a) What is the usual current rating of the fuse wire in the line of electric iron, geysers, room heater etc are in use? 1
- b) What is earthing of an electric appliance? 1
- c) Write two advantages of AC over DC. 2

**OR**

Give two reasons why connections are made in parallel in a domestic electric circuit. 2

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