

DAV PUBLIC SCHOOLS, ODISHA
PRE-BOARD EXAMINATION, 2023-24

- Please check that this question paper contains **8** printed pages.
- Set 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.
- Check that this question paper contains **39** questions.
- Write down the Serial Number of the question in the left side of the margin before attempting it.
- 15 minutes time has been allotted to read this question paper. The question paper will be distributed 15 minutes prior to the commencement of the examination. The students will read the question paper only and will not write any answer on the answer script during this period.

CLASS- X
SUB : 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.

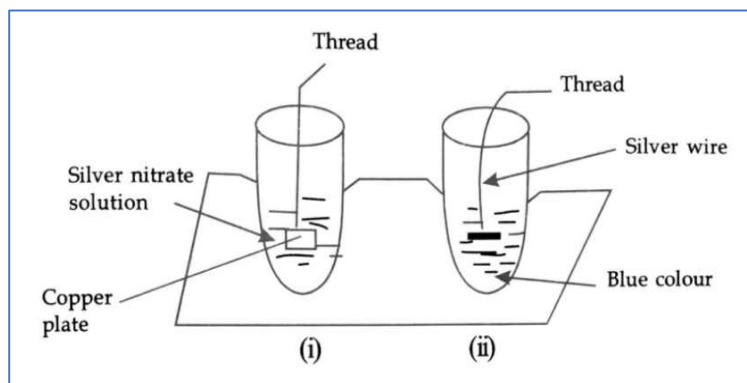
SECTION-A

Select and write the most appropriate option out of the four options given for each of the questions 1- 20. There is no negative mark for incorrect response.

1. Quick lime combines vigorously with water to form (A) which reacts slowly with the carbon dioxide in air to form (B). Compounds (A) and (B) are **1**

		(A)	(B)
	(a)	Calcium carbonate	Calcium hydroxide
	(b)	Calcium hydroxide	Calcium carbonate
	(c)	Calcium sulphate	Calcium bicarbonate
	(d)	Calcium bicarbonate	Calcium carbonate

2. In the following experimental set up, silver nitrate solution and copper sulphate solution are taken in two test tubes (i) and (ii) respectively. 1



The correct observation after the reaction for the above experiment is

- (a) The colour of the solution in test tube (i) remains colourless and that of test tube (ii) remains blue.
 (b) The colour of the solution in test tube (i) becomes blue and that of test tube (ii) remains blue.
 (c) The colour of the solution in test tube (i) becomes yellow and that of test tube (ii) remains blue.
 (d) The colour of the solution in test tube (i) remains colourless and that of test tube (ii) becomes yellow.
3. Identify the correct statements for the following reaction. 1

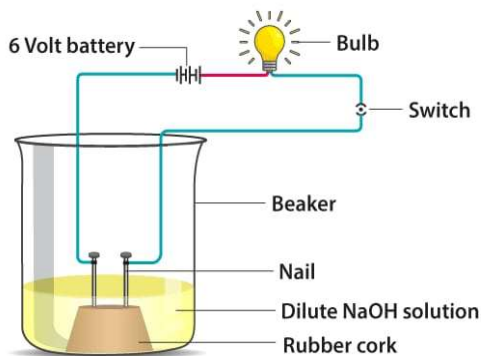


- I. Lead oxide is the oxidising agent.
 II. Carbon dioxide is getting oxidised.
 III. Carbon is getting oxidised.
 IV. Lead oxide is getting reduced.

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

4. To demonstrate the electrical conductivity through an electrolyte, a teacher took dilute sodium hydroxide solution, two iron nails connected to the two terminals of the battery. He connected a bulb and a switch in the circuit. The whole experimental set up is given below: 1

Which among the following statement(s) is (are) correct conclusion for the above experiment?



- (i) Bulb will glow because the electrolyte is acidic.
 (ii) Bulb will glow because NaOH is a strong base and does not furnish ions for conduction.
 (iii) Bulb will glow because the circuit is incomplete.
 (iv) Bulb will glow because NaOH is a strong base, furnishes ions and the circuit is complete.

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

5. A solid salt sample is heated as shown in the given figure. Choose the most appropriate property/ (ies) of the solid sample from the given options which is / are incorrect if the salt sample is solid calcium chloride.

1

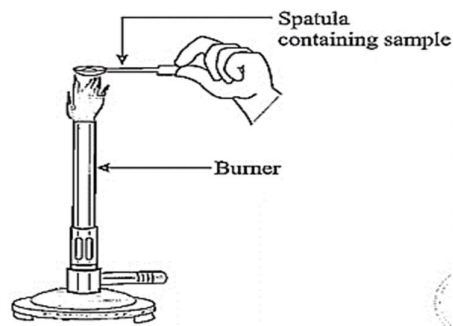
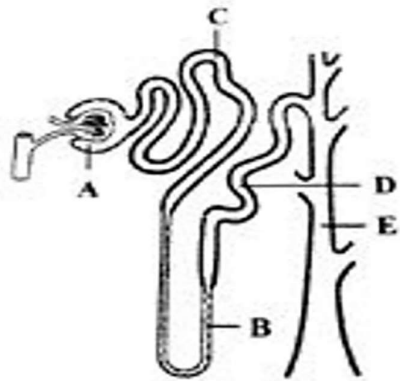


Figure 3.7
Heating a salt sample on a spatula

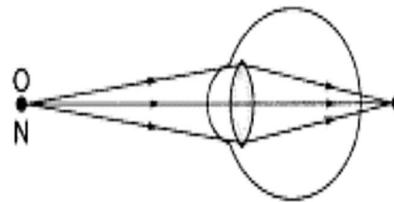
- (i) High melting and boiling point
(ii) Soluble in water
(iii) Soluble in solvent like petrol.
(iv) Do not conduct electricity in solid state.
- (a) (ii) only (b) (i), (ii) and (iv) only (c) (ii) and (iv) only (d) (iii) only
6. A gas 'X' is produced at anode by electrolysis of brine. When the gas 'X' is passed on dry 'Y', produced 'Z' and H₂O. Z is used as an oxidizing agent in many chemical industries. Then X, Y and Z are respectively 1
- (a) chlorine gas, slaked lime, bleaching powder.
(b) hydrogen gas, oxygen gas, hydrogen peroxide.
(c) hydrogen gas, slaked lime, bleaching powder.
(d) chlorine gas, lime stone, bleaching powder.
7. Identify the correct observations, when magnesium metal is added to water. 1
- (i) It does not react with cold water.
(ii) It reacts with hot water to form magnesium hydroxide and hydrogen gas.
(iii) It reacts more violently with cold water.
(iv) Bubbles of oxygen gas formed stick to the surface of magnesium.
- (a) (i) and (iii) (b) (ii) and (iii) (c) (i) and (ii) (d) (iii) and (iv)
8. The correct sequence of anaerobic reactions in yeast is 1
- (a) Glucose cytoplasm, Pyruvate mitochondria, Ethanol
+ Carbondioxide
(b) Glucose cytoplasm, Pyruvate cytoplasm, Lactic acid
(c) Glucose cytoplasm, Pyruvate mitochondria, Lactic acid
(d) Glucose cytoplasm, Pyruvate cytoplasm, Ethanol
+ Carbondioxide
9. Manisha put some germinated seeds in a pot. Every day she watered the seedlings. She found the root moving deep into the soil. Name the type of movement shown by the root. 1
- (i) Geotropism (ii) Phototropism (iii) Hydrotropism (iv) Chemotropism
(a) Both i and iii (b) Only ii (c) Both ii and iii (d) Both i and iv
10. Identify the incorrect statements about transmission of nerve impulse from the following. 1
- (a) Nerve impulse travels from dendritic end towards axonal end.
(b) At the dendritic end electrical impulses bring about the release of some chemicals which generate an electrical impulse at the axonal end of another neuron.
(c) The chemicals released from the axonal end of one neuron cross the synapse and generate a similar electrical impulse in a dendrite of another neuron.
(d) A neuron transmits electrical impulses not only to another neuron but also to muscle and gland cells.

11. Two pea plants, one with round green seeds (RR yy) and another with wrinkled yellow (rrYY) seeds, produce F1 progeny that have round yellow (RrYy) seeds. When F1 plants are self-pollinated, the F2 progeny will have a new combination of characters. Choose the new combinations from the following. **1**
- (i) Round, yellow (ii) Round, green
 (iii) Wrinkled, yellow (iv) Wrinkled, green
 (a) (i) and (ii) (b) (i) and (iv) (c) (ii) and (iii) (d) (i) and (iii)
12. The given figure represents a single nephron from a mammalian kidney. Identify the part (s) where selective reabsorption occurs. **1**



- (a) A, B, C (b) C, B, D (c) A, B, D, E (d) A, B, E
13. The magnification produced by an optical device is always '+1'. It is a **1**
- (a) convex mirror (b) concave lens (c) plane mirror (d) concave mirror.
14. The name of the eye defect shown in the given diagram and the type of lens used for its correction respectively are **1**

- (a) myopia and convex lens.
 (b) hypermetropia and convex lens.
 (c) presbyopia and bifocal lens.
 (d) hypermetropia and concave lens.



15. An aquarium is an example of **1**
- (a) natural terrestrial ecosystem (b) natural aquatic ecosystem
 (c) artificial terrestrial ecosystem (d) artificial aquatic ecosystem
16. Choose the chemical from the following that depletes the ozone. **1**
- (a) Carbon monoxide (b) UV Rays (c) Carbon dioxide (d) Chloro - fluoro carbon

Question number 17 to 20 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 the assertion (A) and reason(R) are true and reason (R) is the correct explanation of assertion (A).
 (b) Both assertion (A) and reason(R) are true but reason(R) is not the correct explanation of assertion (A).
 (c) Assertion (A) is true but reason(R) is false.
 (d) Assertion (A) is false but reason(R) is true

17. **Assertion (A):** Calcium carbonate on heating gives calcium oxide and carbon dioxide gas. **1**
Reason (R): Heating of calcium carbonate is a photolytic decomposition reaction.

18. **Assertion (A):** Pollen grains from the carpel stick to the stigma of stamen. 1
Reason (R): The fertilised egg cells grow inside the ovules and the ovules become seeds.
19. **Assertion (A):** Magnetic field produced outside a current carrying solenoid is uniform. 1
Reason (R): Magnetic lines of force inside a current carrying solenoid are parallel.
20. **Assertion (A):** Gradual accumulation of harmful toxic substance at each trophic level of a food chain is called bio magnification. 1
Reason (R): Maximum concentrations of harmful chemicals are found in human beings.

SECTION – B

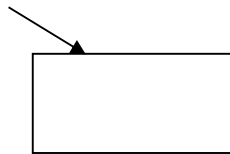
Q. no. 21 to 26 are very short answer questions.

21. A salt is produced by the reaction between an acid and a base. Write the formula of the acid and the base from which the following salts have been formed. 2
 (a) Na_2SO_4 (b) NH_4Cl
22. Many plants like sugarcane, roses or grapes use vegetative parts for their propagation. Give any two reasons. 2
23. Justify: 2
 (a) The rate of breathing is faster in aquatic organisms than terrestrial organisms.
 (b) Lungs always contain a residual volume of air.

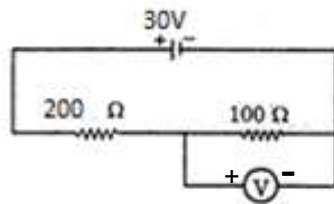
OR

Leaves of a healthy potted plant were coated with vaseline. Will this plant remain healthy for long? Give reasons for your answer.

24. Redraw the given diagram and trace the path of the ray till it emerges out of the glass slab. Show the lateral displacement in it. 2

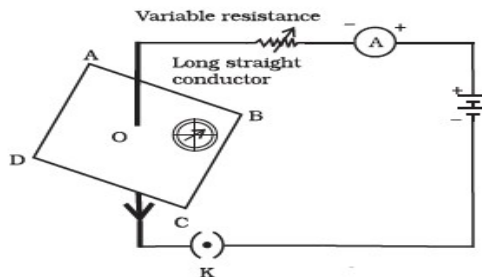


25. Observe the given electric circuit carefully and find the reading of the voltmeter. 2



OR

A compass needle is placed near a current-carrying conductor as shown in the figure.



- State the change you will observe in the deflection of the compass needle, if
- (a) the magnitude of electric current in the conductor is doubled.
 (b) the distance between the compass needle and the conductor is halved.
- Give reason for your answer in each case.

26. In the following food chain, only 200J of energy is available to the big fish. 2

Phytoplankton → Zooplankton → Small fish → Big fish

Calculate the amount of energy available to the primary consumer.

SECTION-C

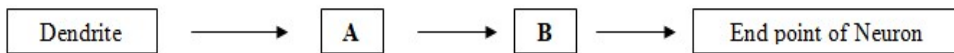
Question No. 27 to 33 are short answer questions.

27. (a) Show the formation of Sodium oxide by transfer of electron using electron dot structure. 3
 (b) Sodium metal is kept immersed in kerosene. Justify.
28. (a) A metal X exists in liquid state at room temperature. Name the ore of X and write its chemical formula.
 (b) Explain the process of extraction of zinc from its concentrated carbonate ore (by chemical reactions only). 3

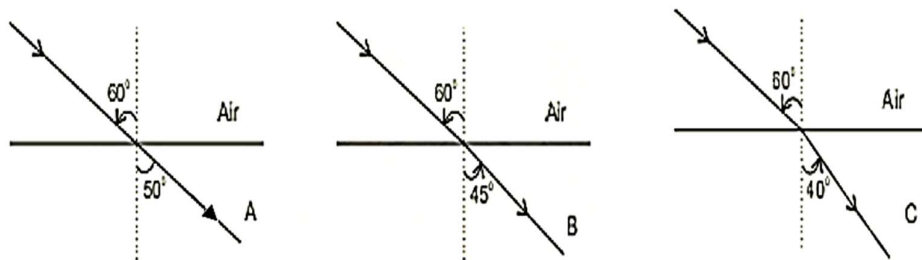
OR

A reddish-brown metal 'X', when heated in air, gives a black compound 'Y', which when heated in presence of H₂ gas, gives 'X' back. 'X' is refined by the process of electrolysis. This refined form of 'X' is used in electrical wiring.

- (a) Identify 'X' and 'Y'.
 (b) Draw a well-labelled diagram to represent the process of refining of 'X'.
29. (a) Identify **A** and **B** in the given flow chart of transmission of information through a neuron. 3



- (b) Distinguish between spinal nerve and cranial nerve. (One point)
 (c) Name the part of the brain responsible for shock absorption.
30. (a) Name the sex chromosome found in human male gamete. 3
 (b) Sex of the new born in human being is determined by father. Justify.
31. Analyze the diagrams given below in which the path of a light ray, from air to three different mediums **A**, **B** and **C** for a given angle of incidence, is shown. Answer the following questions. 3

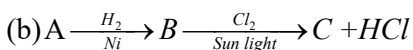


- (a) If μ_A , μ_B and μ_C denote the refractive indices of the three mediums **A**, **B** and **C** respectively, arrange μ_A , μ_B and μ_C in descending order.
 (b) Find the refractive index of medium **B** with respect to air.
 (c) Predict how the angle of refraction will change when the angle of incidence increases in the above cases.
32. (a) Define electric power and write its SI unit. 3
 (b) Two bulbs rated 100 W at 220 V and 60 W at 220 V are connected in parallel to an electric mains of 220V. Find the total current drawn by both the bulbs from the mains.
33. (a) The magnetic field of a current carrying circular loop having 500 turns is 500 times the magnetic field produced by a single turn. Give reason. 3
 (b) (i) Draw the magnetic lines of force of two parallel, straight current carrying conductors carrying same amount of current in the same direction.
 (ii) Find the net magnetic field due to these wires at a point which lies exactly in the middle of them.

SECTION: D

No 34 to 36 are long answer questions.

34. (a) Draw the structure and write the IUPAC name of 1st member of alkene. 5



If C is Chloroethane, identify A and B.

Name the type of reactions and also write the equations for each of the following.

- (i) A to B (ii) B to C

OR

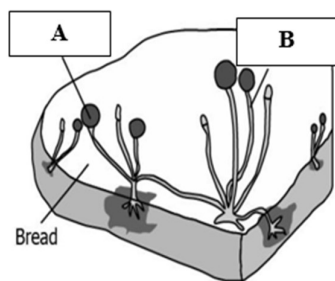
(a) Two different organic compounds X and Y have same molecular formula C₃H₆O. Draw the structures of X and Y and identify the relation between X and Y.

(b) Convert Ethanol to Ethene with the help of chemical reaction(s).

(c) Distinguish between ethanol and ethanoic acid on the basis of

- (i) litmus solution. (ii) baking soda .

35. Study the diagram and answer the following. 5



(a) Identify the asexual mode of reproduction shown here.

(b) Name and identify the

- (i) thread-like structures that developed on the bread.
(ii) tiny blob-on-a-stick like structures that are involved in reproduction.

(c) How does this organism get benefited by adopting this method of reproduction?

OR



(a) Identify the method of reproduction in the above organism. Explain the process.

(b) Name another organism which has the ability to give rise to new body parts by adopting this method.

36. A 12 cm tall object is placed perpendicular to the principal axis of a convex mirror at a distance of 15 cm in front of it. The radius of curvature of the mirror is 60 cm. 5

(a) Find the distance of the image, thus formed, from the mirror.

(b) Compute the height of the image.

(c) Draw a ray diagram to show the formation of image in this case.

(d) Mention the nature of the image.

OR

A 2.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 10cm. The distance of the object from the lens is 15 cm.

- Find the distance of the image, thus formed, from the lens.
- Compute the ratio of height of the object to the height of the image.
- Draw a ray diagram to show the formation of image as mentioned in this case.
- Mention the nature of image.

37. Amar was asked by his teacher to investigate the effect of alkaline potassium permanganate on ethanol. So, he took about 3 ml of ethanol in a test tube and warmed it gently in a water bath. Then he added 5% solution of alkaline KMnO_4 drop by drop to it followed by acidification. He observed that the colour of KMnO_4 slowly faded on heating and gradually it disappeared completely. **1+1+2**

- Name the reaction involved in this experiment. Name any other reagent which can be used in place of alkaline KMnO_4 .
- Write the chemical equation involved in the above experiment.
- Write the IUPAC name and draw the structure of the compound formed in the given experiment. Also state the role of alkaline KMnO_4 .

OR

- Draw the electron dot structure of the compound formed in the above experiment done by Amar and also find the number of covalent bonds in it.

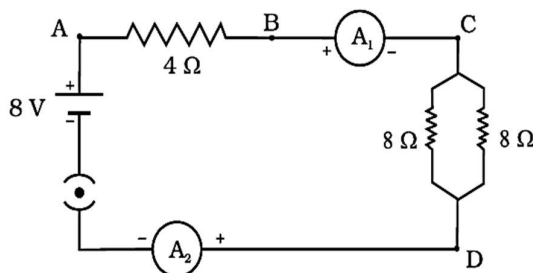
38. Sahin performed an experiment to study the inheritance pattern of genes in pea plant. She crossed tall pea plants (TT) with short pea plants (tt) and obtained all tall plants in F_1 generation. **1+1+2**

- State the genotype of F_1 generation.
- Only tall plants were observed in F_1 progeny. Give reason.
- When F_1 plants were self - pollinated, a total of 800 plants were produced. How many of these would be tall and short plants? Give the genotypic ratio of F_2 generation.

OR

- When F_1 plants were cross - pollinated with plants having **tt** genes, a total of 800 plants were produced. How many of these would be tall and short plants? Give the genotype of F_2 generation.

39. A student was conducting an experiment in the laboratory with 3 resistors of different resistances. He arranged them in a particular manner as shown in the following circuit diagram. Understand the circuit and answer the following questions related to the given circuit. **1+1+2**



- Calculate the total resistance across 'C' and 'D'.
- Find the reading of the ammeter ' A_1 '.
- Calculate the heat dissipated in the circuit in 4s.

OR

- Calculate the power dissipated by $4\ \Omega$ resistor.