DELHI PUBLIC SCHOOL, CHANDIGARH

Pre-Board Examination, Session 2023-24

Class: X, Subject: Science (Set 2)

Time: 3:00 hrs MM: 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 in the range of 50 to 80 words

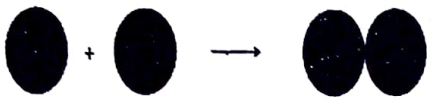
vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.

vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

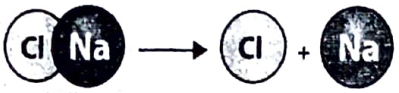
Section A

1. Out of the given figures identify the type of reaction taking place

I



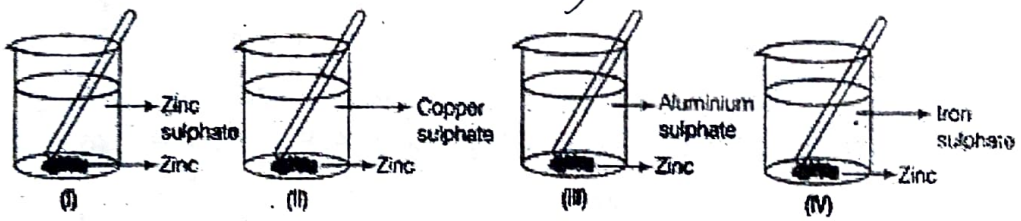
II



(a) I-Combination, II-Decomposition (b) I- Decomposition, II- Combination

(c) I- Displacement, II- Decomposition (d) I- Decomposition, II-Displacement

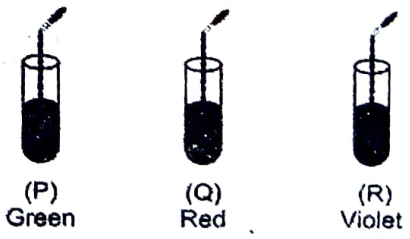
2. Zinc granules were added to zinc sulphate, copper sulphate, aluminium sulphate and iron sulphate as shown below. You would observe the deposition of metal on zinc in beakers-



(a) I and II (b) II and IV

(c) I and III (d) III and IV

3. On adding a few drops of universal indicator to unknown solutions P, Q, and R in different test tubes the following results were obtained. Choose the option that correctly identifies the pH value of the three.



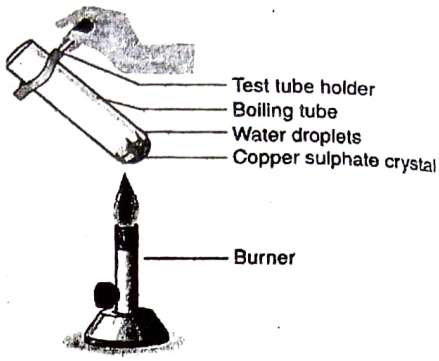
(a) P > Q > R

(b) R > P > Q

(c) Q > P > R

(d) R > Q > P

4. Observe the diagram given and predict the colour change of the compound after heating:



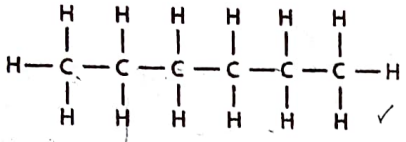
(a) Blue to green

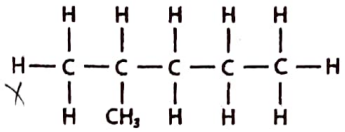
(b) Green to blue

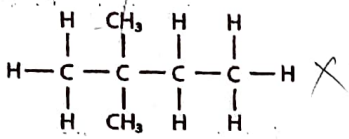
(c) Blue to white ✓

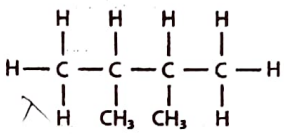
(d) White to blue

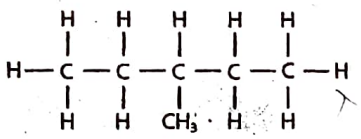
5. The following figures represent isomers of which hydrocarbon?

(a)


(b)


(c)


(d)


(e)


(a) Butane (b) Pentane

(c) Hexane (d) Octane

6. The hetero atoms present in CH_3-CH_2-O-CH_2-CH_2Cl are:

(i) oxygen (ii) carbon

(iii) hydrogen (iv) chlorine

a) i and ii b) ii and iii

c) iii and iv d) i and iv

7. Which of the given options correctly represents A, B, C and D?

Salt	Formula	Base	Acid
Calcium nitrate	$Ca(NO_3)_2$	$Ca(OH)_2$	A
Copper Sulphate	B	$Cu(OH)_2$	H_2SO_4
C	D	$Mg(OH)_2$	HNO_3

(a) A-HNO_3, B-$CuSO_4$, C-Magnesium Nitrate D-MgN_3

(b) A-HNO_3, B-$CaSO_4$, C-Magnesium Nitrate D-MgN_3

(c) A-HNO_3, B-$CuSO_4$, C-Magnesium Nitrate D-MgN_3

(d) A-HNO_3, B-$CuSO_4$, C-Magnesium Nitrate D-$Mg(NO_3)_2$

8. Which chambers of the human heart contain deoxygenated blood?

(a) Left atrium and left ventricle

(b) Left atrium and right ventricle

(c) Right atrium and left ventricle

(d) Right atrium and right ventricle

9. Which of the following options correctly shows the order of events when a bright light is focused in our eyes?

(a) Bright light → Receptors in eye → sensory neuron→ spinal cord →motor neuron→ eyelid closes

(b) Bright light→ receptors in the eye → spinal cord→ sensory neuron→ motor neuron→ eyelid closes.

(c) Bright light→ receptors in the eye→ sensory neuron→ motor neuron→ spinal cord→ eyelid closes.

(d) Bright light→ receptor in eyes→ spinal cord→ motor neuron→ sensory neuron→ eyelid closes.

10. Given below are the stages of binary fission in *Amoeba.* Which one out of the following would you select as the correct sequence of these stages?

(a) I, II, III, IV

(b) IV, III, I, II

(c) II, III, IV, I

(d) III, I, II, I

11. The number of chromosomes in a human gamete is

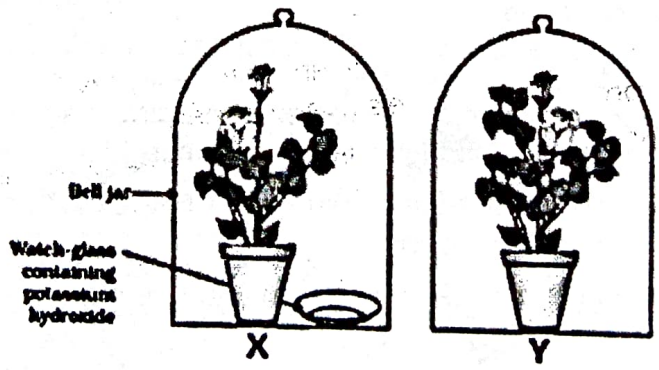
(a) 23

(b) 46

(c) 92

(d) 32

12. The figure shown below represents an activity to prove the requirements for photosynthesis.



The function of KOH taken in set up X is to absorb.

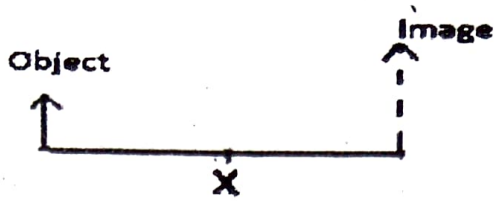
a) Oxygen

b) Moisture

c) Carbon dioxide

d) Sunlight

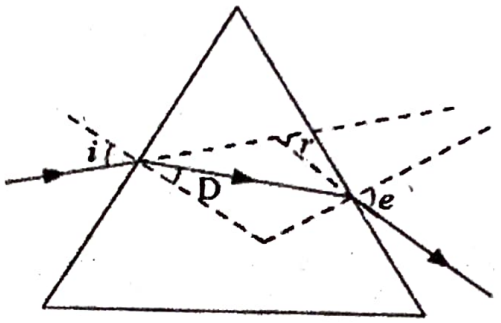
13. Image formation by an optical device X is indicated in the following figure.



The device X is a

(a) Concave mirror
(b) Convex Mirror
(c) Concave lens
(d) Convex lens

14. After tracing the path of a ray of light through a glass prism a student marked the angle of incidence (∠i), angle of refraction (∠ r) angle of emergence (∠e) and the angle of deviation (∠D) as shown in the diagram.



The correctly marked angles are:

(a) ∠ i and ∠ r
(b) ∠ i and ∠ e
(c) ∠ i, ∠ e and ∠ D
(d) ∠ i, ∠ r and ∠e

15. Accumulation of non-biodegradable pesticides in the food chain in increasing amount at each higher trophic level is known as

(a) eutrophication
(b) pollution
(c) biomagnification
(d) accumulation

16. Ozone forms by combination of free oxygen atoms and oxygen molecules. How do free oxygen atoms form at higher levels of atmosphere?

(a) by splitting of molecular oxygen into free oxygen atoms in the presence of low energy UV radiations
(b) by splitting of a molecular oxygen into free oxygen atoms in presence of high energy UV radiations
(c) by the combination of two molecular oxygen in the presence of high energy UV radiations
(d) by the combination of two free oxygen atoms in the presence of lower energy UV radiations

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:** White silver chloride turns grey on exposure to sunlight

Reason: Displacement of silver chloride takes place in presence of sunlight to form silver metal and chlorine gas ✓ (b)

18. **Assertion:** Binary fission takes place in *Amoeba.*

Reason: In binary fission, the cytoplasm of the parent cell divides followed by division of the nucleus and ultimately two new daughter cells are formed. (a)

19. **Assertion:** The magnetic field at the centre of a current carrying loop is a straight line. (c)

Reason: The curvature of concentric circles representing the magnetic field around a current carrying loop becomes larger and larger as we move away from the wire.

20. **Assertion:** Aquariums need regular cleaning.
Reason: There are no microbes to clean water in aquariums, therefore, it needs to be regularly cleaned. (a)

SECTION B

Q. No. 21 to 26 are very short answer questions carrying 2 marks each.

21. Name two amphoteric oxides. Support your answer with equations for any one of them

22. How do *Plasmodium* and *Leishmania* reproduce? Write one difference in their mode of reproduction. Binary fission

23. Why is the rate of breathing in aquatic organisms much faster than in terrestrial organisms? ✓

OR

Name the part of the human excretory system where nephrons are found. Write the components which are involved in ultrafiltration and reabsorption.

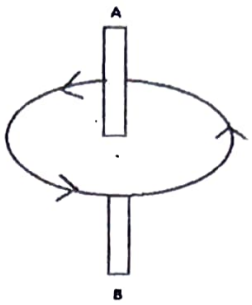
24. The following table gives the values of refractive indices of few media

Medium	Alcohol	Crown Glass	Flint Glass	Sapphire	Diamond
Refractive Index	1.33	1.52	1.65	1.77	2.42

(a) Use the table to give a pair of media so that light speeds up maximum when it goes from one of these media to another.

(b) Draw a ray diagram to indicate the path of light from Crown Glass to Flint Glass.

25. The following figure indicates the magnetic field pattern around the current carrying conductor AB.



(a) In which direction current is flowing through the conductor? East

(b) Name and state the rule that can be used for finding the direction of the magnetic field in this case. Right hand thumb rule

OR

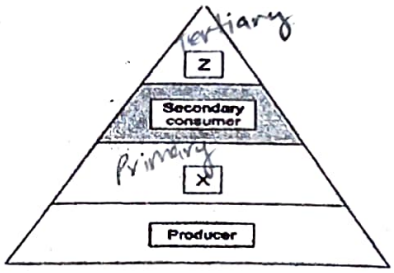
(a) Two wires A and B are of equal length and have equal resistance. If the resistivity of A is more than that of B, which wire is thicker? Explain.

26. (a) Study the food chain given below and answer the questions that follow:

10000 1000 100 10
Plant → Frog → Snake → Eagle

If the amount of energy available at the fourth trophic level is 100 Joules, then how much energy will be available at the producer level? Justify your answer.

(b) Write the appropriate names of trophic levels Z and X in the figure.



SECTION C

Q. No. 27 to 33 are short answer questions carrying 3 marks each.

27. (a) Write the chemical name and formula of limestone. What happens when it is heated strongly? Give the equation. ~~CaCO3~~ $CaCO_3$

(b) A baker baked a cake which was hard and small in size. Which ingredient has he forgotten to add, that would have made the cake fluffy. Give reason. baking soda

28. (a) Differentiate between a mineral and an ore. naturally dug and extract minerals

(b) Give two differences between calcination and roasting. Sulphides unlimited oxygen Carbonate limited oxygen

OR

(a) Magnesium does not react with cold water. State its reaction condition with water and write a balanced equation for the same.

(b) How do metals and non-metals react? Illustrate with an example.

29. (a) A man had a swollen neck. His doctor advised him to eat iodised salt.

(i) Name the disease from which the man is suffering.

(ii) Mention the hormone, due to the imbalance of which, he is suffering from this disease.

(iii) Which endocrine gland secretes this hormone?

(b) A young green plant receives sunlight from one direction only. Explain what will happen to its shoots. Name the phenomenon.

30. (a) How many types of gametes will be formed from TtYy?

(b) How is the sex of the child determined in human beings? Explain with the help of a flow chart along with the explanation.

31. A student is unable to clearly see the words of the advertisement displayed on a hoarding placed at a distance of 4 m from him.

(a) Name the defect of vision the boy is suffering from.

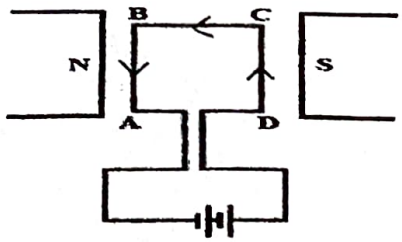
(b) Draw the ray diagram to show this defect.

(c) Which type of lens should be used for its correction? Calculate its power.

32. (a) The cord used to supply the electric current to a heater does not glow whereas its element glows. Explain.

(b) A heater is rated at 4.4KW;220V. Calculate the current drawn by the heater and resistance of its heating element.

33. A current carrying rectangular wire ABCD is kept between the two poles of a horseshoe magnet as shown in the following figure.



(a) Write the direction in which the force will act on the arm BA.

(b) List any two factors on which the force acting on this coil can be increased.

(c) In which direction the force will act on the arm CB. Explain.

Section D

Q. No. 34 to 36 are long answer questions carrying 5 marks each.

34. (a) A liquid organic compound is taken in a dry test tube and a small piece of sodium metal is dropped into it. A colourless combustible gas is evolved. The gas burns with a blue flame and a popping sound.

i) Identify the gas and the liquid organic compound.

ii) Name the product formed and write the chemical equation.

(b) Give a test to experimentally differentiate between a saturated and an unsaturated hydrocarbon.

(c) The boiling points of three hydrocarbons A, B, and C is -162°C, -42.2°C and -0.5°C respectively. Which of these will have maximum number of carbon atoms in its molecule. Justify.

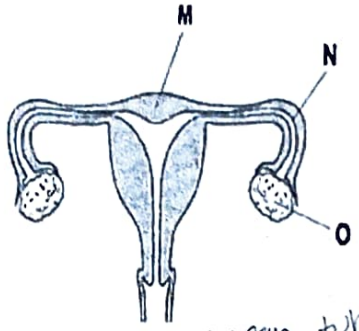
OR

(a) What is a homologous series? Write its characters (any 2).

(b) How are saturated organic compounds converted to unsaturated one? Explain with an example. Also mention the reaction condition.

(c) What is denatured alcohol?

35. (a) Based on the given diagram answer the following questions:



(i) Label 'M 'and 'N' – Fallopean tube

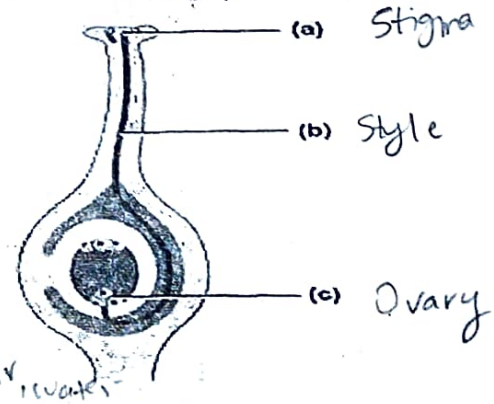
(ii) Write two functions of 'O'. Ovary secretes female gametes

(b) State the role of placenta in the development of embryo.

(c) Which structure needs to be blocked surgically in females to prevent pregnancy?

OR

(a) The diagram shows germination of pollen grain on a stigma Study the structure and answer the following questions:



Pollination Birds, Air, insects

(i) Name the parts marked 'b' and 'c' in the diagram.

(ii) What happens to the part marked 'c' after fertilisation takes place?

(b) (i) Name the process by which pollen grains are transferred from anther to stigma. Mention any one external agent which performs this process in some flowers.

(ii) Differentiate between two types of the above process.

36. No matter how far you stand from a mirror, your image always appears erect and diminished.

(a) Identify the type of mirror.

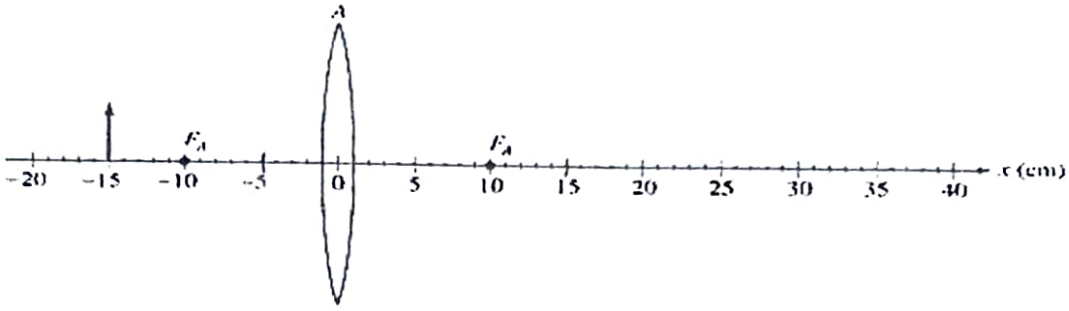
(b) If the focal length of this mirror is 10 cm and the object is placed at a distance of 30 cm, find the position of the image.

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

(d) Write any one use of this mirror in our day-to-day life.

OR

A thin lens **A** is positioned on X-axis as shown in the figure.



An object of height 5 cm, represented by the arrow, is positioned 15 cm to the left of lens A.

(a) Identify the lens.

(b) Draw the ray diagram to show the image formation by the lens for the above case.

(c) Calculate the position and height of image produced by the lens A.

(d) Write any two uses of this lens in our daily life.

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. A soap is a sodium or potassium salt of long chain carboxylic acid which has cleansing property with water. Example is sodium stearate ($C_{17}H_{35}COO\text{-}Na^+$) and sodium palmitate ($C_{15}H_{31}COO\text{-}Na^+$). Since soap solutions are basic in nature they turn red litmus blue.

(a) If two samples of water (hard and soft) are taken, how will you differentiate between the two using soap solution?

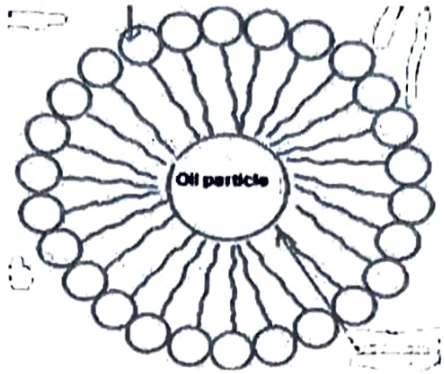
(b) For the above in case soap solution is not available, can we use a detergent solution to distinguish between hard and soft water? Explain giving reason.

(c) During cleaning of dirt, why is agitation necessary to draw clothes clean?

(d) Give one advantage of soaps over detergents.

OR

(d)



Identify the structure given above. Redraw and label it.

38. A scientist crosses a tall pea plant (TT) with a dwarf pea plant (tt). He gets all tall pea plants in F1 generation. If now, the pea plants of F1 generation are selfed, then he obtains pea plants of F2 generation.

Make a cross and answer the following:

(a) Write the genotype of F1 progeny.

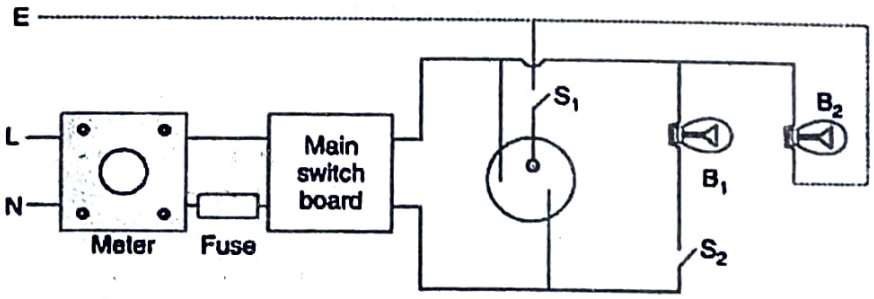
(b) Give a reason why all tall plants are observed in F1 progeny.

(c) What will be the phenotypic and genotypic ratio in F2 generation when F1 progeny is self-pollinated?

OR

(c) When above F1 plants are cross- pollinated with plants having tt genes, a total of 800 plants were produced. How many of these would be tall, medium height or short plants?

39. The given figure shows a domestic electric circuit. Study this circuit carefully.



(a) State what happens when switch S_2 is closed.

(b) Write the colour of the insulation used for (i) Neutral wire (ii) Live wire

(c) List any two errors in the circuit.

OR

(c) Describe the working of earth wire in a circuit.