SHAPING FUTURES. BUILDING LEGACIES

ST KABIR PUBLIC SCHOOL

SECTOR 26, CHANDIGARH, 160019

POST MID TERM EXAMINATION (2024-25)

Class- X
Subject- SCIENCE (086)

Duration-3 hours
Max. Marks – 80

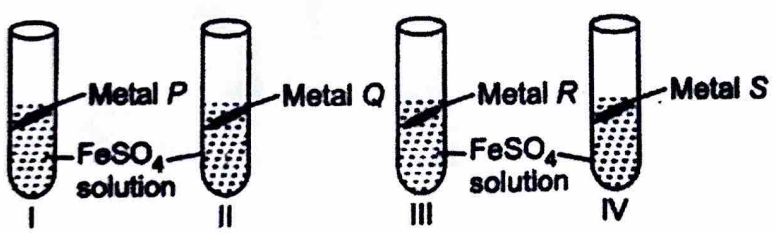
General Instructions:

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. Answers to these questions should be in the range of 80 to 120 words.
vi) 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

Q.No	Questions	Marks
1	Rohan took 10 mL of freshly prepared iron sulphate solution in four different test tubes and added four different metal strips to each test tube as shown below:	1



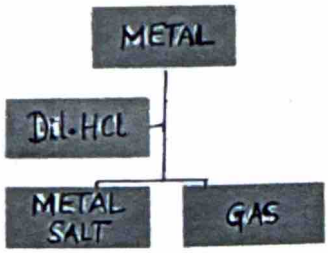
In test tubes I and III, black residue was obtained while in test tubes II and IV, no change was observed. Metals P, Q, R and S could be respectively.

A. Al, Cu, Pb, Ag
B. Pb, Cu, Ag, Al
C. Zn, Al, Cu, Ag
D. Zn, Cu, Al, Ag.

2 If a few drops of phenolphthalein are added to a dilute solution of sodium carbonate, the solution turns pink. If carbon dioxide is passed through this solution, the pink color disappears because: 1

A. Carbon dioxide reacts with sodium carbonate to form an acid
B. Carbon dioxide reacts with phenolphthalein
C. Carbon dioxide reacts with water to form an acid
D. Carbon dioxide turns phenolphthalein colorless

3 Which of the following two combinations are correct? 1



S No.	Metal	Gas Evolved
I	Copper	Yes
Ii	Iron	Yes
Iii	Magnesium	No
Iv	Zinc	Yes

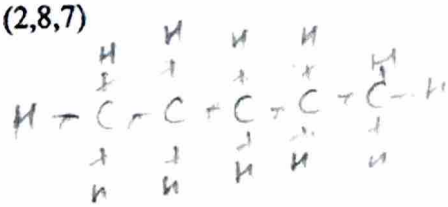
A. i and iii B. i and iv C. ii and iii D. ii and iv

4 A sample of rainwater collected in an industrial area has a pH of 4. What does this indicate about the nature of the rainwater, and what could be the likely cause? 1
A. The rainwater is acidic, likely due to pollutants like Sulphur dioxide and nitrogen oxides.
B. The rainwater is basic, likely due to limestone particles in the air.
C. The rainwater is neutral but contaminated with minerals.
D. The rainwater is strongly basic due to industrial discharge.

5 Why does aluminium not corrode easily, even when exposed to air? 1
A. Aluminium does not react with oxygen
B. Aluminium forms a protective layer of aluminium oxide
C. Aluminium is a noble metal
D. Aluminium reacts with carbon dioxide to form a protective layer

6 An element with atomic number____ will form a basic oxide. 1
A. 7 (2,5) B. 10 (2,8) C.20 (2,8,8,2) D. 17 (2,8,7)
Nitrogen Neon

7 How many covalent bonds are present in Pentane? 1
A. 5 B. 12 C. 16 D. 17



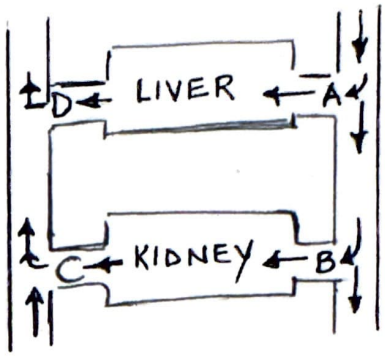
8 Exchange of genetic material takes place in 1
A. vegetative reproduction
B. sexual reproduction
C. budding
D. asexual reproduction

9 A homozygous dominant guinea pig with black fur is crossed with a homozygous guinea pig with white fur. The F1 generation is crossed with itself. 1

What percentage of F2 generation is expected to show white fur coat?

(A) 25% (B) 50% (C) 100% (D) 75%

10 The diagram given represents the liver, kidney and some associated blood vessels. Identify the vessel from the labelled parts A-D in which the blood will contain the lowest concentration of urea. 1



A. A B. B C. C D. D

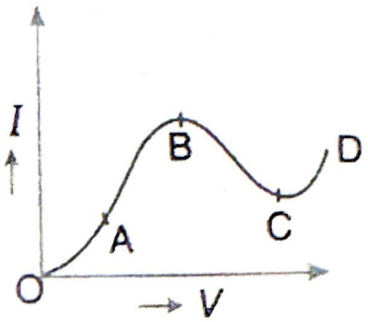
11 In spirogyra, asexual reproduction takes place by 1
A. breaking up of filaments into smaller bits.
B. division of cells into many cells.
C. division of cells into two cells
D. formation of young cells from older cells.

12 Which trophic level is incorrectly defined? 1
A. Carnivores - secondary or tertiary consumers
B. Decomposers - microbial heterotrophs
C. Herbivores - primary consumers
D. Omnivores - moulds, yeast and mushrooms.

13 Ozone protects life on earth as 1
A. it absorbs harmful ultraviolet radiation
B. it helps in photosynthesis
C. it regulates temperature
D. it reduces air pollution.

14 If producers have 10,000J of energy, what amount of energy will the secondary consumers have? 1
A. 1000J B. 10J C. 1J D. 100J

15 The given image shows I-V plot for a non-ohmic resistor. In which region of the plot, its resistance is negative? 1



A. Part OA B. Part AB C. Part BC D. Part CD

16 In torches, searchlights and headlights of vehicles, the bulb is placed 1
A. Between the pole and the focus of the reflector
B. Very near to the focus of the reflector.
C. Between the focus and the centre of curvature of the reflector.
D. At the centre of curvature of reflector.

Q. no 17 to 20 are Assertion – Reasoning based questions. These consist of two statements – Assertion (A) and Reason I.
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
I A is true but R is false
(d) A is False but R is true

17 **Assertion (A):** The heat produced in a resistor is directly proportional to the time for which the current flows through it. 1
Reason (R): The heat produced by a conductor does not depend upon the resistance of the conductor.

18 **Assertion (A):** The pH of a solution of ammonium sulphate is slightly acidic. 1
Reason (R): Ammonium sulphate is a salt of a strong base and a weak acid.

19 **Assertion (A):** Lungs always contain a residual volume of air. 1
Reason (R): It provides sufficient time for oxygen to be absorbed and for the carbon dioxide to be released.

20 **Assertion (A):** Synapses form the functional junction that help communication between two consecutive neurons. 1
Reason (R): Neurotransmitters(chemicals) at the synapse help in transmission of nerve impulse to the next neuron.

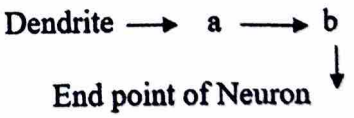
SECTION – B

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

21 (a) Name the part of brain which is responsible for the following actions: 2
(i) Maintaining posture and balance
(ii) Beating of heart.
(b) Name a gland associated with brain. Which disease is caused due to the deficiency of the hormone produced by this gland.

OR

(a) Identify a and b in the given flow chart of neuron through which information travels as an electrical impulse.



(b) State two ways the spinal cord is protected.

22 (a) Tendrils encircle or coil around the object in contact with it. Elaborate. 2
(b) State an example of negative geotropism.

23 (a) The first trophic level in a food chain are always green plants. Why? 2
(b) Bacteria and Fungi are a very important part of an ecosystem. Justify.

24 A cake recipe requires baking soda, but you accidentally used twice the recommended amount. What effect will this have on the taste and texture of the cake? Explain the reason behind it. 2

25 Why does the cord of an electric heater not glow while the heating element does? 2

OR

Why are the conductors of electric heating devices, such as bread toasters and electric irons, made of an alloy rather than a pure metal?

26 With the help of a diagram show how can we arrange two prisms such that a ray of white light entering a prism finally emerges out as a ray of white light only? 2

SECTION - C
Q.no. 27 to 33 are short answer questions.

27 A convex lens has a focal length of 25cm. Calculate the distance of the object from the lens if the image is to be formed on the opposite side of the lens at a distance of 75cm from the lens. What is the size of the image if the needle is 5cm in height? 3

28 A student focused the image of a candle flame on a white screen by placing the flame at various distances from a convex lens. He noted his observation in the following table: 3

Distance of the flame from lens	60	40	30	24	12
Distance of screen from lens	20	24	30	40	70

Analyze the above table and answer the following questions:
A. What is the focal length of the lens?
B. Which set of observation is incorrect and why?
C. Draw a ray diagram to show the image formation for any correct set of observation.

29 Why is series arrangement not used for domestic circuits? Give at least three reasons. 3

30 Samples of four metals X, Y, Z, and W were tested by adding them to different metal salt solutions. The following results were observed: 3

Metal	Lead (II) nitrate	Copper (II) chloride	Zinc nitrate	Silver nitrate
X	Displacement	Displacement	No reaction	Displacement
Y	No reaction	Displacement	No reaction	Displacement
Z	No reaction	No reaction	No reaction	No reaction
W	Displacement	Displacement	Displacement	Displacement

Based on the table, answer the following questions:
i) Which metal is the most reactive and why?
ii) Which metal container can be used to safely store above given solutions and why?
iii) Arrange the metals X, Y, Z, and W in the order of decreasing reactivity.

31 An ore on heating in air produces Sulphur dioxide. Which process would you suggest for its concentration? Describe briefly any two steps involved in the conversion of this concentrated ore into related metal. Support your answer with chemical equations. 3

OR

You are provided with three Metals-Sodium, Magnesium and Copper. Using only water as a reactant, how will you arrange them in increasing order of reactivity? Explain with the help of chemical equations.

32 (a) Energy is required by an organism even during sleep. Why? 3
(b) Two green plants are kept separately in oxygen free containers, one in dark and other in sunlight. It was observed that plants kept in dark could not survive for long. Give reason for this observation.
(c) A patient whose gall bladder was removed was recommended to eat less oily food. Explain.

33 Give reasons 3
(a) Respiration in aquatic vertebrates differs from that in terrestrial vertebrates.
(b) During the daytime, water and minerals travel faster through xylem as compared to the night.
(c) Kidneys are homeostatic organs.

SECTION – D

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

34 (a) Draw the diagram of female reproductive system and mark the points: 5
(i) Where a block is created surgically to prevent fertilization.
(ii) Where copper T is inserted.
(iii) Where the condom is placed.

(b) Trace the path of sperms from where they are produced to the exterior.
(c) Mention changes the uterus undergoes (i) to receive the zygote.

OR

(a) Draw a labelled diagram of the longitudinal section of a flower to show fertilization, and label and mark
(i) cells that fuse with the male nucleus to form endosperm.
(ii) opening through which the pollen tube enters to release the male nuclei.
(b) Fertilization in flowering plants is termed as 'double fertilization'. Explain
(c) Mention any two changes observed in a flower after fertilization.

35 5
a) A cyclic compound X has molecular formula C_6H_6. It is unsaturated and burns with a sooty flame. Identify X and write its structural formula.

b) How will you prove that C_4H_8 and C_5H_{10} are homologues? Give two reasons.
c) What is an oxidizing agent? What happens when an oxidizing agent is added to ethanol? Explain with the help of a chemical equation.

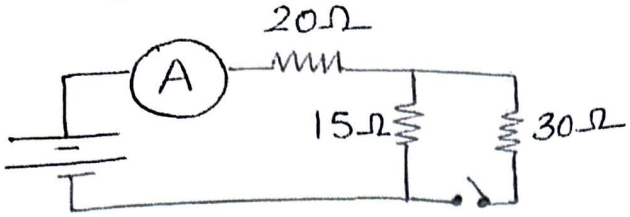
OR

a) How many isomers are possible for the compound with the molecular formula C_4H_{10}? Name them. Also, draw the electron dot structure of its branched chain isomer.

b) Write the IUPAC names of the following-
i) $CH_3 - CH(CH_3) - CH_2COOH$ ii) CH_3-CH_2OH

c)What is added to groundnut oil when it is converted to Vanaspati ghee? What is this reaction called?

36 A. From the given circuit diagram, calculate: 5



(i) Effective resistance of the circuit when switch is open.
(ii) Effective resistance of the circuit when switch is closed.
(iii) Potential difference across 15Ω resistor if a 12 V battery is used and switch is closed.
(iv) Difference in ammeter readings when switch is open and when it is closed.

OR

A. An electric bulb is rated 220V, 100W. Find its resistance and calculate the energy consumed by the bulb in a month of 30 days if it is used on 220V supply for 10 hours per day. Also, find out the cost incurred in using this bulb for this duration if each unit of electrical energy costs Rs. 5.

B. A given length of wire is doubled on itself and process is repeated once again. By what factor does the resistance of the wire change?

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 subparts.

37 Read the following and answer the following questions: 4

Mirage is an optical illusion that occurs when the ground gets strongly heated, so that the air near the ground is much warmer than the air above the ground. Light rays from the sky are strongly refracted upwards near the surface giving the appearance of a pool of water on the ground.

A. Which phenomenon (in addition to refraction) plays a major role in the formation of a mirage?

B. In which direction does light bend as it comes from sky towards the ground? (based on the information given above)?

a) Towards Normal b) away from normal c) goes undeviated

C. What is critical angle? How is it related to mirage formation?

OR

C. Mirage is observed in areas with warm climate? Explain.

38 The most obvious outcome of the reproductive process is the generation of individuals of similar design, but in sexual reproduction they may not be exactly alike. The resemblances as well as the differences are marked. The rules of heredity determine the process by which traits and characteristics are reliably inherited. Many experiments have been done to study the rules of inheritance. 4

(a) Why an offspring of human being is not a true copy of his parents in sexual reproduction?
(b) While performing experiments of inheritance in plants, what is the difference between F1 and F2 generation?
(c) Why do we say that variations are useful for the survival of a species over time?

OR

(c) Mendel studied a cross between two plants with a pair of contrasting characters.

RRYY X rryy

Round, Yellow Wrinkled, Green

He observed 4 types of combination in F2 generation.

(i) Which of these were new combinations?

(ii) Why do new features which were not present in the parent (F1) generation appear in F2 generation

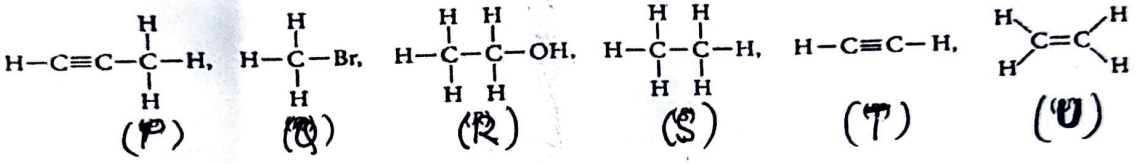
39 The table shows the electronic structures of four elements. 4

Element	Electronic configuration
P	2,6
Q	2,8,1
R	2,8,7
S	2,8,8

a) Identify which element(s) will form covalent bonds with carbon.Give reason also.

b) "Carbon reacts with many elements to form several compounds." Give suitable reason.

OR



(P) (Q) (R) (S) (T) (U)

b) Which of the above compounds P, Q, R,S,T,U belong to the same homologous series? Name those compounds.

29/11

Leena 29/11/24

29/11/24 29/11/24