SHAPING FUTURES, BUILDING LEGACIES

ST KABIR PUBLIC SCHOOL

SECTOR 26, CHANDIGARH, 160019

PRE BOARD EXAMINATION (2025-26)

Class- X **Max. Marks: 80**
Subject- SCIENCE (086) **Time Duration:3 hours**
General Instructions:

(i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.

(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.

SECTION A

Marks

1 Transpiration is the process of water movement through a plant and its evaporation from aerial parts. What is the most significant function of this process for the plant? 1

A. To release excess energy absorbed from the sun.
B. To create a suction force that pulls water up from the roots.
C. To store water in the leaves for use during dry conditions.
D. To provide water as a reactant for cellular respiration

2 Plant hormones, or phytohormones, control various growth responses. Which hormone is responsible for the bending of a plant tendril when it comes in contact with a support? 1

A. Gibberellin B. Cytokinin C. Abscisic acid D.Auxin

3 The exchange of materials between the mother and the developing foetus is crucial for a healthy pregnancy. This exchange occurs through which specialized tissue? 1

A. Ovary B.Uterus C.Fallopian tube D.Placenta

4 A normal human somatic (body) cell contains 46 chromosomes. How many of these are classified as autosomes (non-sex chromosomes)? 1

A. 46 B.44 C.23 D.2

5 The ozone layer is a region of Earth's stratosphere. What is its primary importance for the survival of life on Earth? 1

A. It maintains the planet's temperature through the greenhouse effect.
B. It absorbs most of the Sun's harmful ultraviolet (UV) radiation.
C. It is the primary source of atmospheric oxygen needed for respiration.
D. It creates the Earth's magnetic field, deflecting solar wind.

6 Consider the following statements about the human excretory system: (i) The kidneys are the main organs of excretion, filtering waste from the blood. (ii) The nephron is the structural and functional unit of the kidney. (iii) Urine is temporarily stored in the ureters before being passed out. (iv) The removal of nitrogenous wastes like urea from the body is called excretion. 1

Which of the above statements are correct?

A. (i), (ii), and (iv) B.(ii) and (iii) only

C. (i) and (iii) only D. All are correct.

7 The common bread mould, Rhizopus, spreads rapidly under moist and warm conditions. How does it primarily reproduce asexually? 1

A. Through budding B. Through fragmentation

C. Through vegetative propagation D. Through spore formation

The following two questions consist of two statements – Assertion (A) and Reason (R).

Answer these questions by 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.

8 **Assertion (A)**: The transmission of a nerve impulse across a synapse is a chemical process. 1

Reason (R): When an impulse reaches an axon terminal, it triggers the release of neurotransmitters that diffuse across the synaptic gap.

9 **Assertion (A)**: Placenta has no role in the removal of waste from the foetus. 1

Reason (R): Wastes from the foetus diffuse into the mother's blood through the placenta.

10 During haemodialysis, the dialysis fluid is continuously replaced with fresh fluid. Justify why this is a necessary step in the procedure for a patient with kidney failure. 2

11 **Attempt either option A or B** 2

A. List the three key events that occur during the process of photosynthesis in the chloroplasts of a leaf.

OR

B. State the primary function of platelets and plasma in human blood.

12 What would be the consequences for an ecosystem if all decomposers, such as bacteria and fungi, were to vanish? Provide two reasons. 2

13 Explain the phenomenon of phototropism in plants. Name the plant hormone responsible for this movement and describe its mechanism of action that causes a plant shoot to bend towards a light source. 3

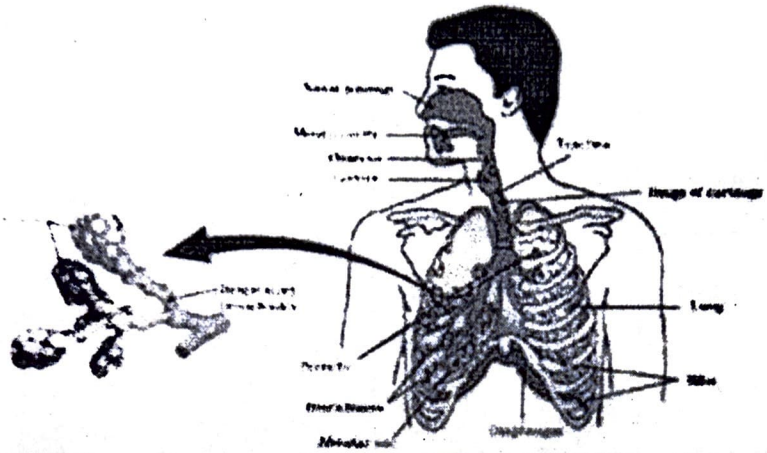
14 In a monohybrid cross, Mendel observed that crossing a pure-breeding tall pea plant with a pure-breeding dwarf pea plant resulted in all tall plants in the F1 generation. 3

(i)What principle of inheritance is demonstrated by the results of the F1 generation?

(ii)When the F1 plants were self-crossed, what was the phenotypic ratio of tall to dwarf plants observed in the F2 generation?

(iii)State the law that explains the reappearance of the dwarf trait in the F2 generation.

15 The diagram below shows the human respiratory system. the questions that follow. 4



A. State the function of the cartilaginous rings in the trachea.

B. Describe two features that make alveoli ideal for efficient gaseous exchange.

C. Explain the mechanism of inhalation, detailing the roles of the diaphragm and rib muscles.

OR

C. Name the respiratory pigment in human blood. Explain its role in the transportation of oxygen.

16 **Attempt either option A or B** 5

A. (i) Differentiate between regeneration and fragmentation as modes of asexual reproduction.

(ii) Explain how Plasmodium reproduces asexually. Name this process.

(iii) List two reasons why offspring produced by asexual reproduction are often called clones.

OR

B. Sunita is a 26-year-old woman with a regular 28-day menstrual cycle. She and her husband wish to delay pregnancy. The doctor explains the timing of ovulation, the process of fertilisation and implantation, and advises suitable contraceptive methods.

a) Identify the day of ovulation/unsafe period in a normal 28-day menstrual cycle.

b) Name the site of fertilisation and the site of implantation in the human female.

c) Explain why oral contraceptive pills are effective in preventing pregnancy.
d) State one advantage and one limitation of barrier methods of contraception.
e) Draw a labelled diagram of the human female reproductive system.

SECTION-B CHEMISTRY

17 Which of the following correctly depicts the type of reaction involved in the formation of slaked lime from quicklime? **1**

A. Endothermic + Combination
B. Exothermic + Combination
C. Endothermic + Decomposition
D. Exothermic + Displacement

18 A teacher demonstrates electrolysis using three liquids: **1**

Liquid	Conductivity Result	Bulb Observation
A	Strong conductor	Bulb glows brightly
B	Weak conductor	Bulb glows dimly
C	Non-conductor	Bulb does not glow

Which observation correctly matches the strength of the electrolyte?

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

19 Bleaching powder loses its smell of chlorine on long exposure to air because **1**

A. it absorbs HCl from air
B. it decomposes to form $CaCO_3$
C. it reacts with CO_2 and moisture
D. it gets oxidised by sunlight

20 The pH values of four solutions are given below: **1**

Solution	pH Value
P	1.8
Q	6.5
R	7.0
S	9.5

Arrange these solutions in increasing order of H^+ ion concentration.

A. P < Q < R < S
B. S < R < Q < P
C. R < S < Q < P
D. P < R < S < Q

21 Baking soda is added to a mixture of tartaric acid and water. After a few minutes, the mixture stops producing bubbles.A student claims that all the baking soda has been used up. 1
Which observation would best help verify whether the student's claim is correct?
A. Heat the mixture gently and see if it becomes more acidic.
B. Add a few more drops of water and check if bubbling restarts.
C. Add a few drops of dilute HCl and observe whether CO_2 gas is released.
D. Check the smell of the mixture to see if it becomes pungent.

22 A metal 'X' is extracted by electrolytic reduction of its molten chloride. Which statement BEST explains why chemical reduction is not used? 1
A. X forms a stable oxide
B. X is less reactive than carbon
C. X is more reactive than carbon
D. X chloride is insoluble in water

23 Ethanol → X → Y → Z 1
Where:
X: Product on dehydration of ethanol
Y: Product on bromination of X
Z: Product on oxidation of ethanol
Which combination is correct?
A. X = Ethene, Y = Bromoethane, Z = Ethanoic acid
B. X = Ethane, Y = Bromoethane, Z = Ethanal
C. X = Ethene, Y = Ethanol, Z = Ethanal
D. X = Ethene, Y = Ethanol, Z = Ethanoic acid

24 1
The following question consists of two statements – Assertion (A) and Reason (R). Answer these questions by 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

Assertion (A): Strong bases show high electrical conductivity in aqueous solutions.
Reason (R): Strong bases produce a large number of hydroxide ions in water.

25 A teacher asks her students to identify a metal, M. She gives them the following clues to help them. 2

- Its oxide reacts with both HCl and NaOH.
- It does not react with hot or cold water but reacts with steam.
- It can be extracted by electrolysis of its ore.

a) Identify the metal. What would happen if the metal is reacted with iron oxide?
b) Write the chemical equations for the reaction of the oxide of this metal with HCl and NaOH respectively.

26 A compound **P** decomposes on heating to give **Q** and **R**. 3
Q is a gas that turns lime water milky.
R is a residue that reacts with dilute HCl to produce brisk effervescence.

a) Identify P, Q, and R.
b) Write all balanced chemical equations.

27 **Attempt either option A or B.** 3

A.During the extraction of zinc from **zinc blende (ZnS)**, a student heats the ore in air.
i) Explain why roasting is an essential step before reduction with carbon.
ii) Write the chemical equations for both roasting and reduction steps.

OR

B. A green solution of metal sulphate M was treated with three metals A, B, and C. The observations recorded were:
When A was added → no change
When B was added → solution became colourless
(i) Arrange the metals A, B and M in decreasing order of reactivity.
(ii) Identify suitable metals for A, B, and M, giving reasons for your choices.

28 A laboratory submits four unknown carbon compounds for analysis. Their observations are: 4

Compound P

- Colourless liquid
- Reacts with Na metal to release a gas
- On oxidation gives an acid

Compound Q

- Pungent smell
- Turns blue litmus red
- Reacts with ethanol to give a fruity-smelling product

Compound R

- Does not react with Na
- Burnt in air → produces a yellow flame with soot

Compound S

- Soapy to touch
- Does not form scum in hard water

A Why does R burn with soot? What does this suggest about its structure and saturation? Compare its combustion characteristics with those of a saturated hydrocarbon.

Attempt either option B or C.

B. Identify Compound S and justify your answer. Explain why soaps form scum in hard water.

OR

C. Do compounds P and Q belong to the same homologous series?
Support your answer with comparisons based on:

- General formula
- Functional group
- Chemical reactions mentioned in the data
- Behaviour with Na metal and litmus paper

29 **Attempt either option A or B** **5**

A.i) Name the following compounds according to IUPAC nomenclature-

(a) $CH_3COCH_2CH_2CH_2CH_3$

(b) $CH_3CH_2CH_2COOH$

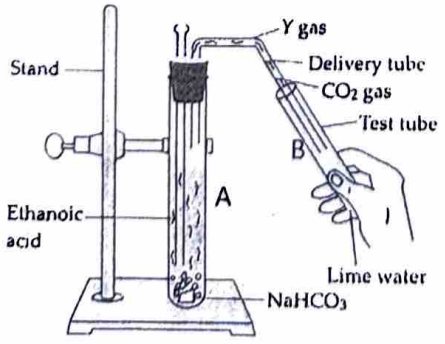
(c) $CH_3CH_2CH_2CH_2CHO$

(d) CH_3CH_2OH

ii) A mixture of ethyne and oxygen is used for welding. Can you justify why a mixture of ethyne and air is not used?

OR

B.i) Refer to the figure given below and answer the following questions-



(a) What change would you observe in the calcium hydroxide solution taken in tube B?
(b) Write the reaction involved in test tubes A and B respectively.

Compound S

- Soapy to touch
- Does not form scum in hard water

A Why does R burn with soot? What does this suggest about its structure and saturation? Compare its combustion characteristics with those of a saturated hydrocarbon.

Attempt either option B or C.

B. Identify Compound S and justify your answer. Explain why soaps form scum in hard water.

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Support your answer with comparisons based on:

- General formula
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(b) $CH_3CH_2CH_2COOH$

(c) $CH_3CH_2CH_2CH_2CHO$

(d) CH_3CH_2OH

ii) A mixture of ethyne and oxygen is used for welding. Can you justify why a mixture of ethyne and air is not used?

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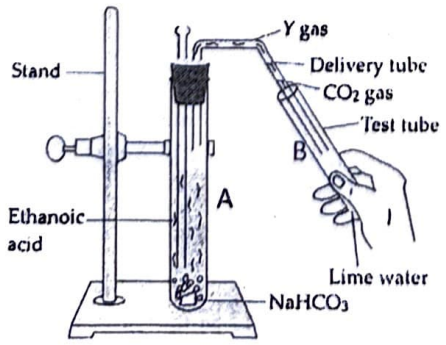
B.i) Refer to the figure given below and answer the following questions-



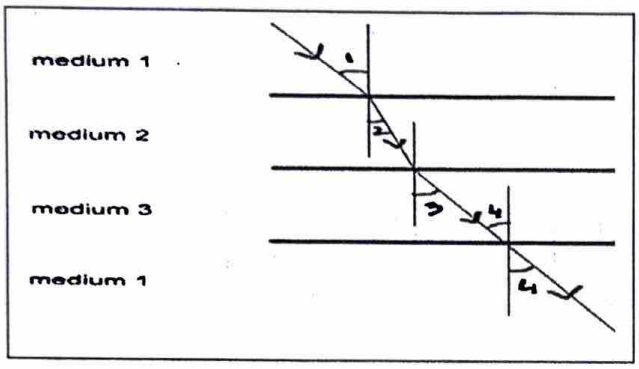
(a) What change would you observe in the calcium hydroxide solution taken in tube B?
(b) Write the reaction involved in test tubes A and B respectively.

(c) If ethanol is given instead of ethanoic acid, would you expect the same change?

ii)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.

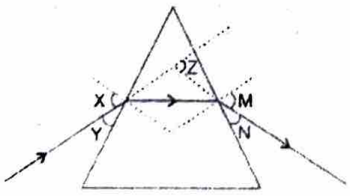
SECTION –C

30 In the following diagram light is travelling through different media. It is noted by a student that ∠1= ∠3= ∠4 but ∠2 <∠1. Which of the following statements is correct? **1**



A. Medium 1 is the denser than medium 3 but it's density is equal to medium 2.
B. Medium 2 is the rarest medium.
C. Medium 3 is denser than medium 1.
D. Medium 1 and 3 are essentially the same medium, but medium 2 is denser than 1 and 3.

31 For the refraction of a ray of light through a glass prism, the path of a ray of light is shown below: **1**



The angle of incidence, the angle of emergence and the angle of deviation respectively have been represented by:

A. Y, N, Z **B.** X, Z, M
C. X, N, Z **D.** X, M, Z

Question no.32. consist of two statements – Assertion (A) and Reason (R). Answer these questions by 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.

32 **Assertion (A):** No two magnetic field lines are found to cross each other. **1**
Reason (R): The compass needle cannot point towards two directions at the point of intersection of two magnetic field lines.

33 **Attempt either A or B** 2

A. Why arecopper and aluminium wires commonly used for transmission of electric current? State two reasons.

OR

B. Tungsten is almost exclusively used for the filament of electric bulbs. Give two reasons to justify this choice.

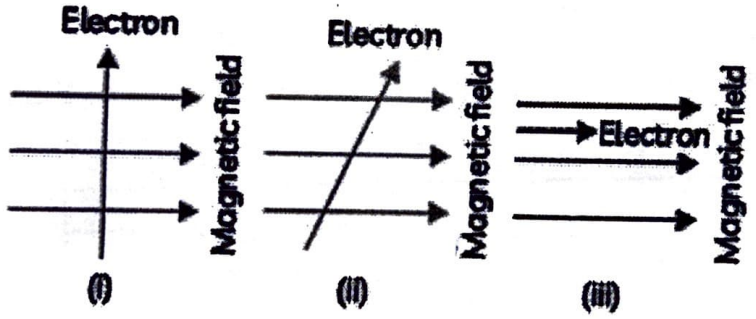
34 Give reason for the following 2

(i) There is either a convergence or a divergence of magnetic field lines near the ends of a current carrying straight solenoid.

(ii) The current carrying solenoid when suspended freely rests along a particular direction.

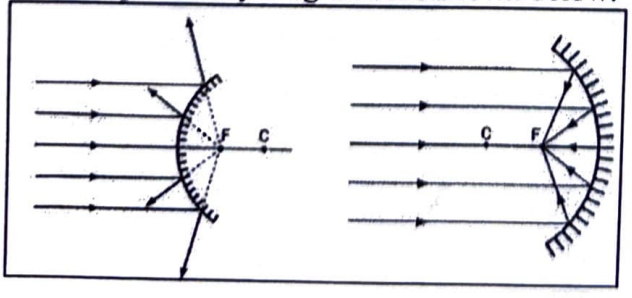
35 A. State the rule used to find the force acting on a current carrying conductor placed in a magnetic field. 3

B. Given below are three diagrams showing entry of an electron in a magnetic field. Identify the case in which the force will be (1) maximum and (2) minimum respectively. Give reason for your answer.



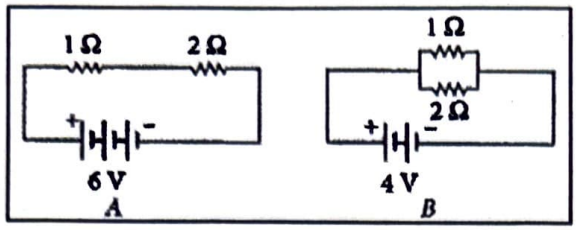
36 At an international airport, engineers are designing an advanced security checkpoint system using mirrors for different purposes.Mirror A is installed above the baggage counter so that security staff can to monitor that area and detect any suspicious movement.Mirror B is fitted inside a scanning module where a high-resolution camera needs to capture magnified details of small items (like jewellery or electronics). 3

Two simplified ray diagrams are shown below:



Match the diagrams with Mirror A and Mirror B. Justify your reasoning using the laws of reflection and mirror properties.

37 Compare the power used in 2 Ω. resistor in each of the following circuits. 3



38 A student uses a convex lens to focus light from a bulb onto the bottom of an aquarium. When the bulb is 30 cm from the lens, a sharp, real image of the bulb filament is seen on the aquarium floor 60 cm below the lens. 4

A. Draw a ray diagram showing image formation when the bulb is at 30 cm.

B. Using the lens formula, calculate the focal length of the lens.

Attempt either subpart C or D

C. Predict and explain the nature, size, and position of the image formed when the bulb is moved within the focal length of the convex lens.

D. The optician compares the experiment to the working of the human eye. He explains that when a person focuses on a near object, the power of the eye lens increases. Explain how the change in curvature of the eye lens affects its power.

39 ***Attempt either A or B*** 5

A. The table given below shows the resistivity of three materials X, Y and Z. Observe the table

and answer the questions that follow:

Samples	X	Y	Z
Resistivity	3×10^{-9}	11.1×10^{-6}	18×10^{17}

I. Arrange the samples in increasing order of conductivity.

II. Which of these is the best resistor and why?

III. Raman responded to the question: Why are electrical appliances with metallic bodies connected to the mains through a three pin plug, whereas an electric bulb can be connected with a two pin plug

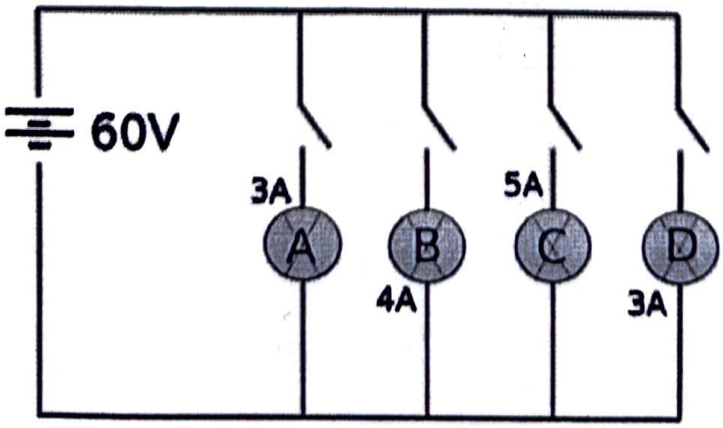
He wrote: Three pin connections reduce heating of connecting wires.

a) Is his answer correct or incorrect? Justify.

b) What is the function of a fuse in a domestic circuit?

OR

B. In the given circuit, A, B, C and D are four lamps connected with a battery of 60V. Analyse the circuit to answer the following questions.



I. Explain with proper calculations that which lamp glows the brightest when the current in the circuit is switched on?

II. Find out the total resistance of the circuit.

III. Two wires A and B are of equal length and have equal resistances. If the resistivity of A is more than that of B, which wire is thicker and why?