SHAPING FUTURES. BUILDING LEGACIES

ST KABIR PUBLIC SCHOOL

SECTOR 26, CHANDIGARH, 160019

POST MID-TERM 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.*

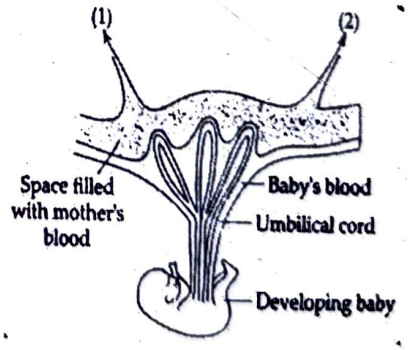
(ii) *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*

SECTION A **Marks**

1 Many processes happen in the bodies of living organisms. Those processes which involve the building up of complex molecules from simple ones are called Anabolism. Those which involve the breakdown of complex molecules into simple ones are called Catabolism. Which of the following life processes can be considered as an example of anabolism? 1

A. Digestion
B. Respiration
C. Transpiration
D. Photosynthesis

2 The diagram shows the arrangement of blood vessels in the uterus, wall and placenta of a pregnant woman. Which of the following will increase in concentration in the blood as it flows from 1 and 2. 1



A. Amino acids
B. Carbon dioxide
C. Glucose
D. Oxygen

3 Consider the following two statements, 1

1. The trait that expresses itself in F1 generation,
2. The trait that keeps on passing from one generation to another.

The appropriate terms for statements 1 and 2 are respectively.

A. recessive trait, dominant trait B. dominant trait, recessive trait.
C. dominant trait, inherited trait. D. recessive trait, inherited trait.

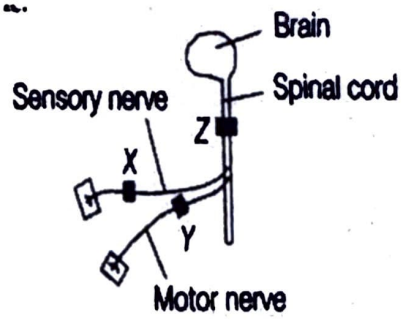
4 If a tall Pea plant is crossed with a pure dwarf Pea plant, then what percentage of F1 and F2 generations will respectively be tall? 1

A. 25%, 25%
B. 50%, 50%
C. 75%, 100%
D. 100 %, 75%

5 Biomagnification is highest in 1

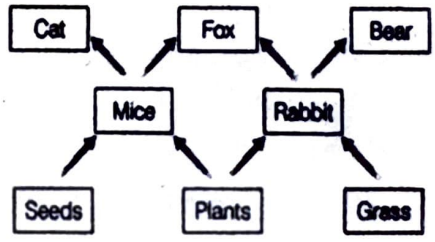
A. Producers,
B. Primary consumer,
C. Secondary consumer,
D. Decomposer

6 The diagram shows the central nervous system which has been blocked in three different places by a drug used as an anaesthetic. Three men had one anaesthetic block at X, Y or Z. One of the men can move his leg in response to a pin prick, but does not feel it. Where is the anaesthetic block in this man? 1



A. At X
B. At Y
C. At Z
D. No block

7 Study the given figure of a food web and identify the primary consumer in the food web. 1



A. Mice and Bear
B. Rabbit and Cat
C. Rabbit and Fox
D. Mice and Rabbit

The following two questions 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.

(iii) How does the stomach prevent itself from the harmful effects of the over production of the substance?

15 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 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 are offsprings of human beings not a true copy of his/her parents in sexual reproduction?

(B) While performing experiments of inheritance in plants, what is the difference between F1 and F2 generation?

Attempt (C) or (D)

(C) Why do we say that variations are useful for the survival of species over time?

OR

(D) Study Mendel's cross between two plants with a pair of contrasting characters RRYY (Round, Yellow) and rryy (wrinkled, green)

He observed four types of combinations in F2 generation.

(i) Which of these were new combinations?

(ii) Why do new features which are not present in the parents appear in F2 generation.

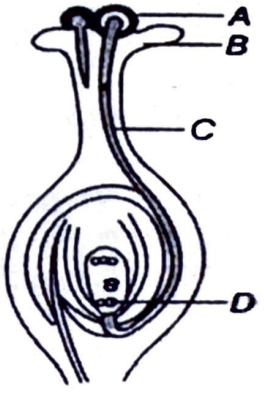
16 **Attempt either A or B** 5

A. (i) A horticulturist uses tissue culture to produce thousands of identical orchid plants.

a. What is the main advantage of tissue culture over natural vegetative propagation?

b. Mention one disadvantage of all plants being genetically identical.

c. Why is tissue culture considered an important method for preserving rare or endangered plants?



(ii)

a. Name the part marked A in the diagram.

b. How does part A reach part B? Identify part marked C.

c. What happens to the part marked D after fertilization is over?

OR

B. (i) a. How is the stability of the DNA of the species ensured in sexually reproducing organisms?

b What will be the ratio of chromosome number between an egg and its zygote?

c. Why is the use of condoms better than using Copper T as a contraceptive?

(ii) Draw the human female reproductive system and label the following parts:

a Part that produces ovum.

b part where fertilisation takes place.

c part where implantation takes place.

SECTON B

17 In an experiment of electrolysis of water: **1**

Gas X is collected at cathode.

Gas Y is collected at anode.

Which is correct?

A. X = H_2, Y = O_2; reaction is decomposition.

B. X = O_2, Y = H_2; reaction is displacement.

C. X = H_2, Y = Cl_2; reaction is neutralisation.

D. X = O_2, Y = H_2; reaction is decomposition.

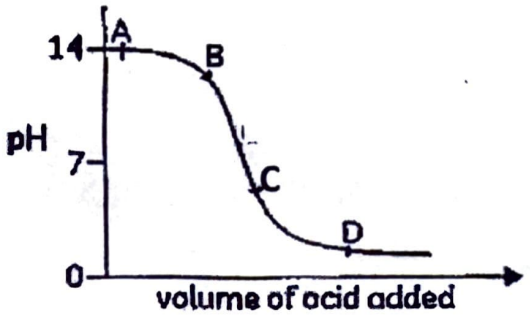
18 In the thermite reaction, aluminium acts as: **1**

A. Oxidizing agent
B. Reducing agent
C. Catalyst
D. dehydrating agent

19 On heating sodium hydrogen carbonate, which products are formed? **1**

A. $NaCl + CO_2 + H_2O$
B. $Na_2CO_3 + CO_2 + H_2O$
C. $NaOH + CO_2 + H_2$
D. $Na_2CO_3 + H_2 + H_2O$

20 The graph given below depicts a neutralization reaction (acid + alkali → salt + water). The pH of a solution changes as we add excess of acid to an alkali. **1**



Which letter denotes the area of the graph where both acid and salt are present ?

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

21 Neetu has two test tubes containing dilute hydrochloric acid and dilute sodium hydroxide solution, but they are not labelled. Adding which of the following solutions to the test tubes will help her visually identify the acidic and basic solution? 1

A. only vinegar
B. only baking soda
C. only sodium chloride
D. tartaric acid

22 Metal A reacts vigorously with cold water, Metal B reacts only with steam, and Metal C shows no reaction even with steam. 1
The correct decreasing order of reactivity is:

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

23 Which of the following is not observed in a homologous series? 1
A. Change in chemical properties
B. Difference in -CH_2 and 14u molecular mass
C. Gradation in physical properties
D. Same functional group

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
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24 **Assertion (A):** Antacids are used to relieve indigestion caused by excess acid in the stomach. 1
Reason (R): Antacids are acidic substances that neutralize stomach acid.

25 A sample of rainwater collected from an industrial area turned blue litmus paper red and had a pH of 4.5. 2

(a) What does this pH value indicate about the nature of the rainwater?

(b) Identify the **gases in the atmosphere** that are most likely responsible for this phenomenon and write the **balanced chemical equations** showing how these gases lead to the observed effect.

26 A metallic element, M, has the following properties: 3

- It floats on water.
- It can be cut with a knife.

- It occurs naturally as its chloride (MCl).
- Its oxide dissolves in water to form a hydroxide.

(a) Explain how the metal M can be obtained from its chloride (MCl). Write a balanced chemical equation for the process.

(b) State any two properties of the compound formed when metal M combines with a non-metal.

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

A. You are given samples of three metals-sodium, magnesium and copper. Suggest any two activities to arrange them in order of their decreasing reactivities. Support your answer with chemical equations.

OR

B. Draw a well labeled diagram of electrolytic refining of copper. What happens at cathode and anode? Explain.

28 Car Engine Emissions 4

An automobile uses petrol (octane, C_8H_{18}) as fuel. When the car engine runs smoothly, there is no visible smoke. However, when the air filter gets clogged, black smoke is emitted from the exhaust.

Condition	Observation
Clean air filter	No smoke, high mileage
Clogged air filter	Black smoke, low mileage

A. Identify the type of combustion in each case and explain.

Attempt either B or C

B. Write the balanced equation for the complete combustion of butane. Which toxic gas is likely to be formed during incomplete combustion? Why is it dangerous?

OR

C. Explain why the mileage of the car decreases when the air filter is clogged. Government have introduced policies like mandatory emission testing for vehicles. Explain how such tests help in controlling air pollution.

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

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

a) $CH_3CH_2CH_2CH_3$ b) $CH_3COCH_2CH_3$ c) HCHO d) CH_3CH_2Cl

ii) Given below is a substitution reaction-

$CH_4 + Cl_2 \rightarrow P + HCl$

$P + Cl_2 \rightarrow Q + HCl$

Identify the compounds P and Q.

OR

B. i) "Methane and Propane and their Isomers are used as fuels" Comment. Draw

the structure of all the possible isomers of immediate upper homologue of butane.

ii)An organic compound X contains two carbon atoms and four hydrogen atoms..On complete hydrogenation, it forms a compound Y with two carbon atoms and six hydrogen atoms.

a) Identify X and Y with their structural formulas.

b) Write a balanced chemical equation for the hydrogenation of X.

SECTION C

30 Which among the two lenses with power- 3D and 4D respectively can form a real image? 1

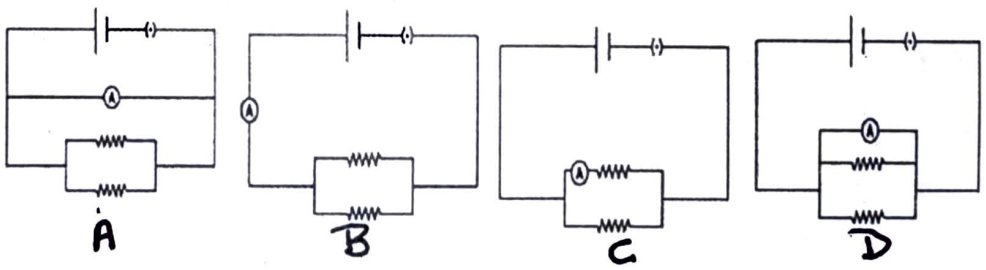
A. only the lens with power -3 D

B. only the lens with power 4 D

C. both the lenses

D. neither of the lenses

31 Kishore connects two resistors in parallel. He wants to measure the total current through the two resistors. Which of the following shows the correct arrangement to measure the current through Ammeter 'A'? 1



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C. A is true, but R is false.

D. A is false but R is true.

32 **Assertion:** Nichrome is used to make heating elements of electric geysers. 1
Reason: Nichrome has high resistivity and high melting point.

33 **Attempt either option A or B.** 2

A. An electric iron rated 1500W, 250V is connected to a 250V supply line. Calculate the current drawn by it and the energy consumed by it in 50 hours.

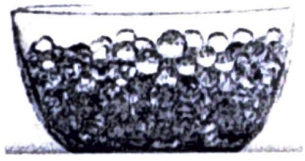
B. Which of these uses more energy, a 250W TV set in 1 hour or a 1200W toaster in 10 minutes?

34 Tina was star gazing. She observed celestial objects P and Q. They were visible brightly in the night sky. She concluded that one was a star and the other was a planet. 3

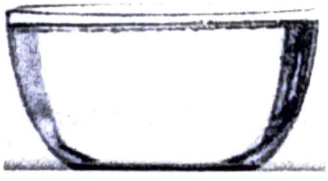
(a) What could she have observed to arrive at her conclusion?
(b) If these celestial objects P and Q were to be observed from the moon, would Tina be able to distinguish them as a star and a planet? Why or Why not?

35 When an object is placed at a distance of 10cm from a convex lens, its virtual image, twice as big as the object, is formed. Where will you place the object in front of the same lens so as to form its real image of twice the size? 3

36 Neeti took some clear gel beads and soaked them in water for a few hours. The gel beads absorbed water and increased in size. She then placed these beads in a glass container. The beads were clearly visible in the container as shown below. 3



Neeti then added water to the container, and it appeared as shown below.



(a)Why are the gel beads not visible on adding water?
(b) Would the gel beads shown in the first image be visible if placed in oil instead of water? Give a reason for your answer.

37 The electrical resistivities of four materials P, Q, R and S are as follows: 3

P: $2.3 \times 10^{-8}\ \Omega$ m Q: $120 \times 10^{-8}\ \Omega$ m

R: $2.1 \times 10^{3}\ \Omega$ m S: $1.1 \times 10^{12}\ \Omega$ m

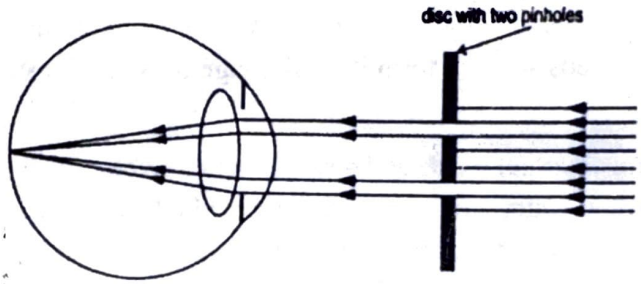
Which material will you use for making:

(a) Handle of soldering iron,
(b) Heating coil of electric heater, and
(c) Solar cell.

Justify your choice.

38 An autorefractor, which is used to automatically measure the refractive errors in a person's eye, makes use of the Scheiner principle explained below. 4

Parallel rays of light from a distant object are limited to two parallel bundles of light using a disc (called Scheiner's disc) with two pinholes. For an eye with no refractive error (emmetropic eye), the rays would be focused on the retina, and only one spot can be observed. But if there is a refractive error in the eye, two spots will be observed.



6

(a) For a myopic eye, how many spots will be observed on the retina?
(b) How can this defect be corrected?

Attempt (c) or (d)

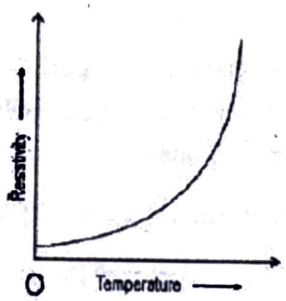
a

(c) What could be the reason for the observation as mentioned in part (i)?
(d) Draw a diagram showing how the light rays fall on the retina of a myopic eye?

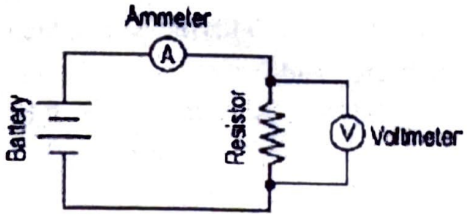
39 **Attempt either A or B.** 4

A. (a) The graph shows the variation of resistivity of copper with temperature.

7

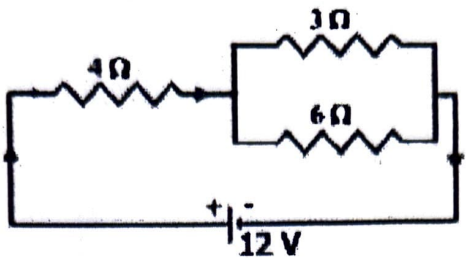


Kishore constructs a simple circuit as shown below. The resistor is made of copper.



He then heats the copper resistor. What will happen to the current flowing through the circuit? Why?

(b) The circuit diagram shown below shows a combination of three resistors. Find:

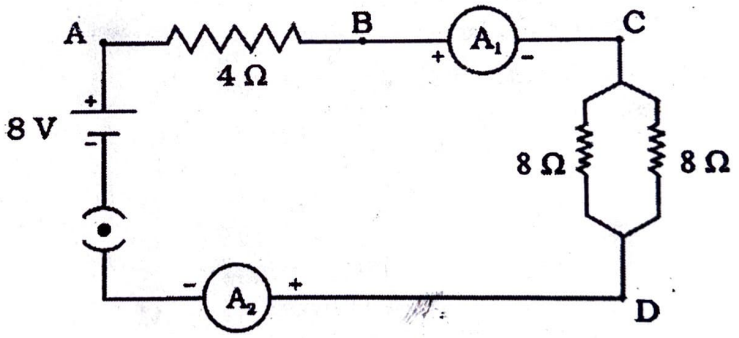


(i) Total resistance of the circuit.
(ii) Total current flowing in the circuit.
(iii) Potential difference across 4Ω resistor.

OR

B. (a) Sameer was required to make an ammeter for his school project. He went to the market to buy material for it. The shopkeeper showed him a copper wire of resistance 0.34Ω and a nichrome wire of resistance 3.4 Ω. Which of the two should he buy? Justify your choice.

(b) In the circuit shown, calculate the following:



(i) Difference in A_1 and A_2 readings, if any.
(ii) Potential difference across the 8Ω resistor.

8 Assertion: Auxin promotes the growth of stems, but inhibits the growth of roots 1

Reason: Different plant parts respond differently to the same concentration of hormones.

9 Assertion: An ecosystem consists of biotic components and abiotic components. 1

Reason: Biotic and abiotic components play important roles for the sustenance of life and work independently in all ecosystems.

10 Attempt either A or B. 2

A. Explain with an example, how the feedback mechanism maintains hormone balance in the body.

B. How does the secretion of adrenaline during danger prepare the body for fight or flight?

11 A. In adolescence, boys develop a deeper voice and facial hair while girls do not. Explain. 2

B. Why is the medulla oblongata called the vital center of the brain?

12 A. State any one cause of depletion of the ozone layer. Name a disease likely to be caused due to depletion. 2

B. Biodegradable and Non-biodegradable wastes should be discarded in two separate dustbins. Justify.

13 (i) 3

Glucose

↓

Pyruvate

↙ ↘

No O_2 O_2

↓ ↓

Lactic acid + Energy $CO_2 + H_2O$ + Energy

a. Identify the type of respiration on each side.

b. Which process releases more energy and why?

(ii) In birds and mammals, the left and right side of the heart are separated. Give reasons.

14 We often hear people complaining about "acidity in the stomach". 3

(i) An overproduction of what substance is most likely the reason for the complaint?

(ii) Why is the production of the substance necessary?