SHUNYASAARTHI

CLASS X · 2026-27 · MODEL PAPER

# Class X Science (Code 086) Model Paper 5

## Question paper

Maximum marks: 80

Time: 3 hours

Subject code: 086

### Instructions

All 39 questions are compulsory, with one selected option for each internal choice.

Sections A, B, and C assess Biology, Chemistry, and Physics respectively.

Show equations, working, units, and labelled diagrams where requested.

# Section A

### Question 1

**1 mark**

Mcq

Choose the correct answer.

**(a)** The growth movement of plant shoots towards light is known as: [1 mark]

**A.** Phototropism
**B.** Geotropism
**C.** Thigmotropism
**D.** Hydrotropism

### Question 2

**1 mark**

Mcq

Choose the correct answer.

**(a)** Which feature best describes budding in Hydra? [1 mark]

**A.** Parent splits symmetrically into two halves
**B.** Gametes fuse to produce a new organism
**C.** An outgrowth forms on the body, detaches and grows independently
**D.** The organism produces resistant spores

## Question 3

1 mark

Mcq

Choose the correct answer.

**(a)** In human sex determination, the probability that a child will be male is: [1 mark]

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

## Question 4

1 mark

Mcq

Choose the correct answer.

**(a)** Which of the following is not a basic life process? [1 mark]

**A.** Nutrition
**B.** Respiration
**C.** Locomotion
**D.** Excretion

## Question 5

1 mark

Mcq

Choose the correct answer.

**(a)** When you unknowingly jerk your hand away upon touching a hot object, this action is an example of: [1 mark]

**A.** voluntary action
**B.** reflex action
**C.** learned response
**D.** conditioned reflex

### Question 6

1 mark

Mcq

Choose the correct answer.

**(a)** Which of these is an example of vegetative propagation? [1 mark]

**A.** Bean plant producing seeds

**B.** Potato tubers producing new plants

**C.** Puffball releasing spores

**D.** Plasmodium undergoing fission

### Question 7

1 mark

Mcq

Choose the correct answer.

**(a)** A woman carrier for an X-linked recessive trait marries a normal man. What proportion of their sons is expected to express the trait? [1 mark]

**A.** 0%

**B.** 25%

**C.** 50%

**D.** 100%

### Question 8

1 mark

Assertion Reason

Choose the correct answer.

**(a)** Assertion (A): In aerobic respiration, glucose is fully broken down to carbon dioxide and water. Reason (R): In the presence of oxygen, pyruvate is broken down in mitochondria to carbon dioxide and water. [1 mark]

**A.** Both A and R true and R explains A

**B.** Both A and R true but R does not explain A

**C.** A true, R false

**D.** A false, R true

## Question 9

1 mark

Assertion Reason

Choose the correct answer.

**(a)** Assertion (A): Reflex actions are faster than voluntary actions. Reason (R): Reflex actions do not involve the forebrain. [1 mark]

**A.** Both A and R true and R explains A

**B.** Both A and R true but R does not explain A

**C.** A true, R false

**D.** A false, R true

## Question 10

2 marks

Short Answer

Answer the question with working and reasons where needed.

**(a)** Suggest two household practices that promote recycling and reuse of materials. [2 marks]

## Question 11

2 marks

Short Answer

Attempt one option.

### Option A

Answer the question with working and reasons where needed.

**(a)** State Mendel's law of independent assortment. [2 marks]

OR

### Option B

Answer the question with working and reasons where needed.

**(a)** Explain how the sex of a human child is determined genetically. [2 marks]

## Question 12

**2 marks**

Short Answer

Answer the question with working and reasons where needed.

**(a)** State any two roles of saliva in the human digestive system. [2 marks]

## Question 13

**3 marks**

Short Answer

Answer the question with working and reasons where needed.

**(a)** If $2 \times 10^5$ J of solar energy falls on the leaves of green plants, calculate the amount of energy stored as chemical energy by producers, given that they capture about 1% of incident sunlight. Also state why this stored energy is important. [3 marks]

## Question 14

**3 marks**

Short Answer

Answer the question with working and reasons where needed.

**(a)** Describe vegetative propagation in plants and name two methods with examples. [3 marks]

## Question 15

**4 marks**

Case Based

Renu conducted an experiment to demonstrate photosynthesis. She placed a potted plant in darkness for 48 hours to de-starch it. After that, she covered half of a leaf (Leaf X) with black paper and placed the plant in sunlight for 6 hours. After exposure, she plucked Leaf X, boiled it in water and then in alcohol to remove chlorophyll. Finally, she soaked the leaf in iodine solution. She observed that only the uncovered part of Leaf X turned blue-black, while the covered part remained brown. Meanwhile, a control Leaf Y, not covered but kept in light, showed blue-black all over when tested with iodine.

**(a)** Identify the biological process Renu demonstrated in her experiment with the de-starched and sun-exposed leaf. [1 mark]

**(b)** Why did Renu keep the plant in complete darkness for 48 hours before exposing the leaf to sunlight? [1 mark]

Attempt one of the final two-mark options.

**Option A**

**(c)** (i) Explain why only the uncovered part of Leaf X turned blue-black when treated with iodine. (ii) Name the cellular organelle responsible for the light-capturing stage of the process demonstrated by Renu. [2 marks]

OR

**Option B**

**(c)** Why did the covered part of Leaf X remain brown after the iodine test, and what does that show about photosynthesis? [2 marks]

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**Question 16** **5 marks**

**Long Answer**

Attempt one option.

**Option A**

Answer both connected parts. Show the required method, explanation and units.

**(a)** Name the enzyme responsible for protein digestion in the stomach, specify its site of secretion, and state the main products formed. [2 marks]

**(b)** Explain the double circulatory system in humans, naming the two circuits and their pathways. [3 marks]

OR

**Option B**

Answer both connected parts. Show the required method, explanation and units.

**(a)** Define transpiration pull and explain how it assists in the ascent of sap. [2 marks]

**(b)** Outline the structure and functions of the stomach, small intestine and large intestine in humans. [3 marks]

# Section B

### Question 17

**1 mark**

Mcq

Choose the correct answer.

**(a)** Copper(II) oxide dissolves in dilute HCl to give a blue-green solution because: [1 mark]

**A.** CuO is reduced

**B.** CuCl is formed

**C.** $CuCl_2$ is formed

**D.** $Cu(OH)_2$ is formed

### Question 18

**1 mark**

Mcq

Choose the correct answer.

**(a)** Why do ionic compounds conduct electricity only in molten or aqueous state? [1 mark]

**A.** Ions are fixed in the crystal lattice

**B.** Electrons are free to move

**C.** Molecules form covalent bonds

**D.** Neutral atoms carry charges

### Question 19

1 mark

Mcq

Choose the correct answer.

**(a)** In a haloalkane, which atom replaces a hydrogen on the carbon chain? [1 mark]

**A.** Oxygen
**B.** Nitrogen
**C.** Halogen
**D.** Sulfur

### Question 20

1 mark

Mcq

Choose the correct answer.

**(a)** Which of the following represents the skeletal chemical equation for the reaction of zinc with sulphuric acid to form zinc sulphate and hydrogen? [1 mark]

**A.** $Zn + H2SO4 \rightarrow ZnSO4 + H2$
**B.** $Zn + SO4 \rightarrow ZnSO4 + H2$
**C.** $Zn + H2SO4 \rightarrow ZnH2 + SO4$
**D.** $Zn + H2SO4 \rightarrow ZnSO4 + H$

### Question 21

1 mark

Mcq

Choose the correct answer.

**(a)** Which of the following indicators turns pink in basic solution but remains colourless in acidic solution? [1 mark]

**A.** Methyl orange
**B.** Phenolphthalein
**C.** Litmus
**D.** Bromothymol blue

## Question 22

1 mark

Mcq

Choose the correct answer.

**(a)** What property of metallic bonding primarily enables metals to be hammered into thin sheets (malleability)? [1 mark]

**A.** Directional covalent bonds

**B.** Nondirectional electrostatic attraction between cations and delocalised electrons

**C.** Hydrogen bonding between layers

**D.** Ionic bonds between fixed ions

## Question 23

1 mark

Mcq

Choose the correct answer.

**(a)** Which of the following reactions is most likely with ethene ($C_2H_4$)? [1 mark]

**A.** Addition of bromine across the C=C bond

**B.** Substitution of a hydrogen atom by chlorine

**C.** Formation of a ring structure without breaking bonds

**D.** Decomposition into methane

## Question 24

1 mark

Assertion Reason

Choose the correct answer.

**(a)** Assertion (A): In a balanced chemical equation, the total mass of reactants equals the total mass of products. Reason (R): Balancing a chemical equation ensures equal numbers of each type of atom on both sides. [1 mark]

**A.** Both A and R true and R explains A

**B.** Both A and R true but R does not explain A

**C.** A true, R false

**D.** A false, R true

## Question 25

**2 marks**

Short Answer

Answer the question with working and reasons where needed.

**(a)** Write the chemical equation for the reaction between copper(II) oxide and dilute hydrochloric acid and state the nature of copper(II) oxide based on this reaction. [2 marks]

## Question 26

**3 marks**

Short Answer

Attempt one option.

### Option A

Answer the question with working and reasons where needed.

**(a)** Describe what happens when an iron nail is placed in copper(II) sulfate solution. Write the balanced equation, the observation, and explain the reaction using the reactivity series. [3 marks]

OR

### Option B

Answer the question with working and reasons where needed.

**(a)** What is corrosion? Describe two methods to prevent it. [3 marks]

## Question 27

**3 marks**

Short Answer

Answer the question with working and reasons where needed.

**(a)** Provide the IUPAC name and structural formula of the compound CH3–CH(OH)–CH3, and identify its functional group. [3 marks]

## Question 28

**4 marks**

Case Based

In a cement factory, limestone (calcium carbonate) is heated strongly in a kiln, decomposing into calcium oxide (quicklime) and carbon dioxide gas. This thermal decomposition reaction is represented by the equation:
$CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

**(a)** According to the passage, which compound is being decomposed on heating? [1 mark]

**(b)** Write the skeletal chemical equation for the process described in the passage. [1 mark]

Attempt one of the final two-mark options.

### Option A

**(c)** (i) Balance the chemical equation for the reaction given in the passage. (ii) Identify the type of chemical reaction illustrated in the passage. [2 marks]

OR

### Option B

**(c)** Count the calcium, carbon and oxygen atoms on both sides of the given equation and explain whether mass is conserved. [2 marks]

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## Question 29

**5 marks**

Long Answer

Attempt one option.

### Option A

Answer both connected parts. Show the required method, explanation and units.

**(a)** Write balanced chemical equations for the neutralisation reactions: (i) sodium hydroxide with hydrochloric acid, (ii) barium hydroxide with sulfuric acid. [2 marks]

**(b)** Describe the neutralisation reaction between sodium hydroxide and hydrochloric acid in terms of ions, and state the products formed. [3 marks]

OR

**Option B**

Answer both connected parts. Show the required method, explanation and units.

**(a)** Write the balanced chemical equation for the reaction of aqueous hydrochloric acid with sodium hydroxide and state one use of the reaction. [2 marks]

**(b)** Explain why phenolphthalein is colourless in acidic solution but turns pink when added to a basic solution. [3 marks]

# Section C

### Question 30

1 mark

Mcq

Choose the correct answer.

**(a)** During accommodation for viewing near objects, what change occurs in the eye lens and its focal length? [1 mark]

**A.** curvature increases and focal length decreases

**B.** curvature decreases and focal length decreases

**C.** curvature increases and focal length increases

**D.** curvature decreases and focal length increases

### Question 31

1 mark

Mcq

Choose the correct answer.

**(a)** A myopic person has a far point of 50 cm. What is the power of the lens required to correct this defect? [1 mark]

**A.** –1.5 D

**B.** –2.0 D

**C.** +2.0 D

**D.** +1.5 D

## Question 32

**1 mark**

**Assertion Reason**

Choose the correct answer.

**(a)** Assertion (A): In an electric circuit, conventional current flows from the positive to the negative terminal of a cell. Reason (R): Electrons move from the negative to the positive terminal inside the conductor. [1 mark]

**A.** Both A and R true and R explains A

**B.** Both A and R true but R does not explain A

**C.** A true, R false

**D.** A false, R true

## Question 33

**2 marks**

**Short Answer**

Answer the question with working and reasons where needed.

**(a)** Explain dispersion of white light through a glass prism and why violet light deviates more than red. [2 marks]

## Question 34

2 marks

Short Answer

Attempt one option.

### Option A

Answer the question with working and reasons where needed.

**(a)** State the expression for the magnetic field due to a long straight current-carrying conductor at a point located at a distance r from it. Also state its SI unit. [2 marks]

OR

### Option B

Answer the question with working and reasons where needed.

**(a)** State two characteristics of the magnetic field inside a long current-carrying solenoid. [2 marks]

## Question 35

3 marks

Short Answer

Answer the question with working and reasons where needed.

**(a)** Describe the characteristics of the image formed by a concave mirror when the object is placed between its pole and principal focus. [3 marks]

## Question 36

3 marks

Short Answer

Answer the question with working and reasons where needed.

**(a)** Explain the pattern of magnetic field lines produced by a current-carrying circular loop. [3 marks]

## Question 37

**3 marks**

**Short Answer**

Answer the question with working and reasons where needed.

**(a)** Explain the concept of electric potential difference between two points in a circuit and define its SI unit. [3 marks]

## Question 38

**4 marks**

**Case Based**

A teacher conducts demonstrations on a flat cardboard: first, a bar magnet is placed and iron filings are sprinkled, showing the arrangement of field lines. Next, a straight conductor connected to a battery is passed normally through the cardboard, and filings show the magnetic field pattern around the current. The conductor is then bent into a circular loop carrying the same current, and filings reveal the field pattern. Finally, multiple turns are arranged to form a long solenoid carrying current and filings show the field inside the solenoid.

**(a)** In the first demonstration with the bar magnet, the iron filings align to form which pattern of magnetic field lines? [1 mark]

**(b)** During the second demonstration with the straight conductor carrying current, the iron filings show which pattern? [1 mark]

Attempt one of the final two-mark options.

### Option A

**(c)** (i) In the third demonstration with the circular loop, what is the shape of the field lines observed at the center of the loop? (ii) In the final demonstration with the solenoid, how are the field lines arranged inside it? [2 marks]

OR

### Option B

**(c)** If the current through the straight conductor is reversed, what happens to its magnetic field, and which rule predicts the new direction? [2 marks]

## Question 39

**5 marks**

**Long Answer**

Attempt one option.

### Option A

Answer both connected parts. Show the required method, explanation and units.

**(a)** A person cannot see objects closer than 1 m clearly. Name the defect and state the type of lens used for its correction. [2 marks]

**(b)** Describe the causes of myopia and explain how it is corrected. Provide three points. [3 marks]

OR

### Option B

Answer both connected parts. Show the required method, explanation and units.

**(a)** State the near point and far point of a normal human eye and give their values. [2 marks]

**(b)** A beam of white light passes through a colloidal suspension and its path becomes visible. Name and explain this phenomenon in three points. [3 marks]