SHUNYASAARTHI

CLASS X · 2026-27 · MODEL PAPER

Class X Science (Code 086) Model Paper 1

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) Roots growing downwards into the soil exhibit which of the following? [1 mark]

A. Negative phototropism

B. Positive geotropism

C. Thigmotropism

D. Photoperiodism

Question 2

1 mark

Mcq

Choose the correct answer.

(a) In binary fission of Amoeba, the plane of division is usually [1 mark]

A. fixed perpendicular to the axis

B. always along the long axis

C. random and can be in any plane

D. determined by food availability

Question 3

1 mark

Mcq

Choose the correct answer.

(a) Mendel's dihybrid cross of pea plants yielding a 9 : 3 : 3 : 1 phenotypic ratio in the F_2 generation illustrates which principle? [1 mark]

A. law of dominance
B. blending inheritance
C. law of independent assortment
D. law of segregation

Question 4

1 mark

Mcq

Choose the correct answer.

(a) In which part of the human alimentary canal does salivary amylase begin starch digestion? [1 mark]

A. Mouth
B. Stomach
C. Small intestine
D. Large intestine

Question 5

1 mark

Mcq

Choose the correct answer.

(a) Which of the following structures constitute the central nervous system? [1 mark]

A. Brain and spinal cord
B. Brain and cranial nerves
C. Spinal cord and spinal nerves
D. Peripheral nerves and muscles

Question 6

1 mark

Mcq

Choose the correct answer.

(a) Planaria fragments regenerate into whole organisms because: [1 mark]

A. each fragment contains spores
B. body segments fuse to form new cells
C. specialised cells proliferate and differentiate to rebuild tissues
D. fragments undergo binary fission

Question 7

1 mark

Mcq

Choose the correct answer.

(a) A hallmark of X-linked inheritance in humans is that the trait: [1 mark]

A. appears more often in males than in females
B. appears equally in both sexes
C. appears only in females
D. appears only in males

Question 8

1 mark

Assertion Reason

Choose the correct answer.

(a) Assertion (A): Plants store excess glucose as starch. Reason (R): Starch is insoluble and does not affect cell osmotic pressure. [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): In Mimosa pudica, leaf folding on touch is independent of growth. Reason (R): Plant cells change shape by altering their internal water content. [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) Explain why an aquarium set up in a classroom must be cleaned periodically, whereas a natural pond does not require such regular cleaning. [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 segregation. [2 marks]

OR

Option B

Answer the question with working and reasons where needed.

(a) Define the term allele as used in genetics. [2 marks]

Question 12

2 marks

Short Answer

Answer the question with working and reasons where needed.

(a) Define life processes and list the main processes involved. [2 marks]

Question 13

3 marks

Short Answer

Answer the question with working and reasons where needed.

(a) List and explain three harmful effects of increased ultraviolet radiation on human health due to ozone layer depletion. [3 marks]

Question 14

3 marks

Short Answer

Answer the question with working and reasons where needed.

(a) Describe three different contraceptive methods and briefly explain how each one prevents pregnancy. [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]

Question 16

5 marks

Long Answer

Attempt one option.

Option A

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

(a) Explain the roles of saliva in the human digestive process. [2 marks]

(b) Outline the structure and functions of the stomach, small intestine and large intestine in humans. [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) Explain the double circulatory system in humans, naming the two circuits and their pathways. [3 marks]

Section B

Question 17

1 mark

Mcq

Choose the correct answer.

(a) Passing the CO_2 evolved from sodium carbonate and HCl through lime water gives a white precipitate because: [1 mark]

- **A.** $CaCO_3$ is formed
- **B.** $Ca(OH)_2$ is formed
- **C.** $Ca(HCO_3)_2$ is formed
- **D.** $CaCl_2$ is formed

Question 18

1 mark

Mcq

Choose the correct answer.

(a) Which property of metals is due to their sea of free electrons reflecting light uniformly? [1 mark]

- **A.** Ductility
- **B.** Malleability
- **C.** Metallic lustre
- **D.** Sonority

Question 19

1 mark

Mcq

Choose the correct answer.

(a) How many electrons does carbon share when forming methane (CH_4)? [1 mark]

A. Two electrons

B. Four electrons

C. Six electrons

D. Eight electrons

Question 20

1 mark

Mcq

Choose the correct answer.

(a) What is the balanced chemical equation for the reaction Fe + H2O → Fe3O4 + H2? [1 mark]

A. 3Fe + 4H2O → Fe3O4 + 4H2

B. Fe + 4H2O → Fe3O4 + 2H2

C. 3Fe + 4H2O → Fe3O4 + 2H2

D. Fe + 2H2O → Fe3O4 + 2H2

Question 21

1 mark

Mcq

Choose the correct answer.

(a) Carbon dioxide reacts with calcium hydroxide to form soluble calcium hydrogen carbonate on excess CO_2 because: [1 mark]

A. $CaCO_3$ dissolves in CO_2 and water

B. CO_2 reduces $CaCO_3$

C. $Ca(OH)_2$ is converted to CaO

D. CO_2 oxidises $Ca(OH)_2$

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 functional group is present in ethanol (C_2H_5OH)? [1 mark]

A. Aldehyde

B. Ketone

C. Hydroxyl

D. Carboxyl

Question 24

1 mark

Assertion Reason

Choose the correct answer.

(a) Assertion (A): In Zn(s) + CuSO4(aq) → ZnSO4(aq) + Cu(s), zinc displaces copper from the solution. Reason (R): Zinc is less reactive than copper. [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 balanced chemical equation for the reaction of aqueous hydrochloric acid with sodium hydroxide and state one use of the reaction. [2 marks]

Question 26

3 marks

Short Answer

Attempt one option.

Option A

Answer the question with working and reasons where needed.

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

OR

Option B

Answer the question with working and reasons where needed.

(a) Compare metals and non-metals in terms of lustre, malleability and electrical conductivity. Give one difference for each. [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]

Question 29

5 marks

Long Answer

Attempt one option.

Option A

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

(a) State the colour shown by (i) red litmus paper in an acidic solution and (ii) blue litmus paper in a basic solution. [2 marks]

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

OR

Option B

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]

Section C

Question 30

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 31

1 mark

Mcq

Choose the correct answer.

(a) What is the far point of a normal human eye? [1 mark]

A. 25 cm

B. 1 m

C. Infinity

D. Depends on accommodation

Question 32

1 mark

Assertion Reason

Choose the correct answer.

(a) Assertion (A): The resistance of a metallic conductor decreases when its temperature is increased. Reason (R): The resistivity of metals increases with temperature. [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) State the near point and far point of a normal human eye and give their values. [2 marks]

Question 34

2 marks

Short Answer

Attempt one option.

Option A

Answer the question with working and reasons where needed.

(a) List the factors on which the magnitude of the force experienced by a current-carrying conductor in a magnetic field depends. [2 marks]

OR

Option B

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]

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) Define accommodation of the human eye and briefly describe how it adjusts to focus on near and distant objects. [2 marks]

(b) Explain how the eye adjusts its focal length to focus on (a) a near object, and (b) a distant object. Give three points in your answer. [3 marks]