SHUNYASAARTHI

CLASS X · 2026-27 · MODEL PAPER

Class X Science (Code 086) Model Paper 3

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) Which of the following traits is acquired and not passed on to offspring? [1 mark]

A. Riding a bicycle
B. Blood group
C. Eye colour
D. Freckles pattern

Question 2 **1 mark**

Mcq

Choose the correct answer.

(a) What is the functional unit of the human kidney called? [1 mark]

A. Nephron
B. Glomerulus
C. Collecting duct
D. Loop of Henle

Question 3

1 mark

Mcq

Choose the correct answer.

(a) Which region of the brain is responsible for interpreting sensory information and higher thinking? [1 mark]

A. Hind-brain
B. Mid-brain
C. Fore-brain
D. Spinal cord

Question 4

1 mark

Mcq

Choose the correct answer.

(a) Fungal spores are advantageous because they are [1 mark]

A. diploid
B. desiccation-resistant and can germinate later
C. formed by fragmentation
D. produced only underground

Question 5

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 6

1 mark

Mcq

Choose the correct answer.

(a) Which of the following is not directly required for photosynthesis? [1 mark]

A. Carbon dioxide
B. Water
C. Oxygen
D. Chlorophyll

Question 7

1 mark

Mcq

Choose the correct answer.

(a) Which characteristic is true of reflex actions but not of voluntary actions? [1 mark]

A. Slower response time
B. Requires conscious decision
C. Does not involve forebrain processing
D. Based on growth in tissues

Question 8

1 mark

Assertion Reason

Choose the correct answer.

(a) Assertion (A): Regeneration is the normal mode of reproduction in Hydra. Reason (R): Hydra reproduces mainly by budding as an outgrowth. [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): All daughters of a normal male (XY) and a colour-blind mother (X^cX^c) will be colour-blind. Reason (R): Colour blindness is a recessive X-linked trait. [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) Write the two-step process by which ozone is formed in the stratosphere, including the role of UV radiation. [2 marks]

Question 11

2 marks

Short Answer

Attempt one option.

Option A

Answer the question with working and reasons where needed.

(a) In an experiment, a potted shoot kept in darkness for two days is then exposed to light from one side. After 48 hours the shoot bends toward the light. State the observation and give the reason. [2 marks]

OR

Option B

Answer the question with working and reasons where needed.

(a) Distinguish between voluntary and involuntary actions with one example of each. [2 marks]

Question 12

2 marks

Short Answer

Answer the question with working and reasons where needed.

(a) Differentiate between fragmentation and budding in asexual reproduction and give one example of each. [2 marks]

Question 13

3 marks

Short Answer

Answer the question with working and reasons where needed.

(a) A community generates 500 kg of daily waste, of which 60% is biodegradable. Calculate the mass of biodegradable and non-biodegradable waste, and suggest appropriate disposal methods for each. [3 marks]

Question 14

3 marks

Short Answer

Answer the question with working and reasons where needed.

(a) Describe the stages of urine formation in the human kidney. [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) State any two features of regeneration as seen in Planaria. [2 marks]

(b) Distinguish between fragmentation and regeneration as modes of asexual reproduction with one example each. [3 marks]

OR

Option B

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

(a) Define budding and give one example of an organism that reproduces by budding. [2 marks]

(b) Outline the main phases of the human menstrual cycle and name the hormones regulating these phases. [3 marks]

Section B

Question 17

1 mark

Mcq

Choose the correct answer.

(a) Why does carbon form a wide variety of stable compounds compared to silicon? [1 mark]

A. Carbon has stronger C–C bonds
B. Carbon has fewer valence electrons
C. Silicon does not bond covalently
D. Silicon atoms are smaller

Question 18

1 mark

Mcq

Choose the correct answer.

(a) Which of the following represents the thermal decomposition of calcium carbonate? [1 mark]

A. $CaCO_3 \rightarrow CaO + CO_2$
B. $CaO + H_2O \rightarrow Ca(OH)_2$
C. $CaCO_3 + HCl \rightarrow CaCl_2 + CO_2 + H_2O$
D. $Ca(OH)_2 \rightarrow CaO + H_2O$

Question 19

1 mark

Mcq

Choose the correct answer.

(a) A solution has pH 2. Which of the following statements is correct? [1 mark]

A. $[H^+] = 2$ M

B. $[H^+] = 10^{-2}$ M

C. $[OH^-] = 10^2$ M

D. It is slightly acidic

Question 20

1 mark

Mcq

Choose the correct answer.

(a) Which of the following metal oxides exhibits amphoteric behavior? [1 mark]

A. Sodium oxide (Na2O)

B. Aluminium oxide (Al2O3)

C. Magnesium oxide (MgO)

D. Calcium oxide (CaO)

Question 21

1 mark

Mcq

Choose the correct answer.

(a) Which feature distinguishes saturated hydrocarbons from unsaturated ones? [1 mark]

A. Presence of rings

B. Only single C–C bonds

C. Branching in the carbon chain

D. Higher molecular weight

Question 22

1 mark

Mcq

Choose the correct answer.

(a) In the reaction Fe + CuSO4 → FeSO4 + Cu, iron displaces copper because iron is more: [1 mark]

A. reactive than copper

B. noble than copper

C. ductile than copper

D. malleable than copper

Question 23

1 mark

Mcq

Choose the correct answer.

(a) Which one of the following reactions represents neutralisation? [1 mark]

A. $HCl + CaCO_3 \rightarrow CaCl_2 + H_2O + CO_2$

B. $H_2SO_4 + Zn \rightarrow ZnSO_4 + H_2$

C. $HCl + NaOH \rightarrow NaCl + H_2O$

D. $CO_2 + Ca(OH)_2 \rightarrow CaCO_3 + H_2O$

Question 24

1 mark

Assertion Reason

Choose the correct answer.

(a) Assertion (A): Metals show lustre because they have mobile electrons at their surface. Reason (R): These electrons reflect incident light from the metal surface. [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 complete combustion of ethanol and state one observable change during 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) Balance the equation Al + HCl → AlCl3 + H2, name the reaction type, and give a brief reason for its classification. [3 marks]

OR

Option B

Answer the question with working and reasons where needed.

(a) Explain the chemical process involved in whitewashing walls using slaked lime. Write the balanced equation and state how a shiny finish is obtained. [3 marks]

Question 27

3 marks

Short Answer

Answer the question with working and reasons where needed.

(a) Describe the neutralisation reaction between sodium hydroxide and hydrochloric acid in terms of ions, and state the products formed. [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) Name the functional group present in aldehydes, write its general formula, and give one example of an aldehyde. [2 marks]

(b) Provide the IUPAC name and structural formula of the compound $CH_3–CH(OH)–CH_3$, and identify its functional group. [3 marks]

OR

Option B

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

(a) Name the functional group in alcohols and give the structural formula of ethanol. [2 marks]

(b) Identify the compound CH3COOH by IUPAC name, show its carboxyl structure, and explain how its functional group differs from ethanol's. [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) Why does the clear sky appear blue to an observer on Earth? [1 mark]

A. Tyndall effect

B. Rayleigh scattering

C. Mie scattering

D. Atmospheric refraction

Question 32

1 mark

Assertion Reason

Choose the correct answer.

(a) Assertion (A): In a series circuit, the current through each resistor is the same. Reason (R): The potential difference across each resistor in series is the same. [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) 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]

Question 34

2 marks

Short Answer

Attempt one option.

Option A

Answer the question with working and reasons where needed.

(a) State two properties of magnetic field lines of a bar magnet. [2 marks]

OR

Option B

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]

Question 35

3 marks

Short Answer

Answer the question with working and reasons where needed.

(a) Explain how a parallel-sided glass slab produces lateral displacement of a ray and name two factors on which the magnitude of this displacement depends. [3 marks]

Question 36

3 marks

Short Answer

Answer the question with working and reasons where needed.

(a) Describe the function of a fuse in a domestic electric circuit. Why is choosing the correct fuse rating important? [3 marks]

Question 37

3 marks

Short Answer

Answer the question with working and reasons where needed.

(a) A bulb is rated 120 W at 220 V. Calculate the current drawn by the bulb and the resistance of its filament. [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) State the near point and far point of a normal human eye and give their values. [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]

OR

Option B

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

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

(b) Explain how a triangular glass prism disperses white light into its constituent colours. Give three points. [3 marks]