CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Science

Subject Code: 086 | Class X

Solutions

Sample Question Paper – Set 3

Time Allowed: 3 Hours **Maximum Marks: 80**

General Instructions

1. This question paper comprises 39 questions. All questions are compulsory.
2. The question paper is divided into three sections: Section A (Biology), Section B (Chemistry) and Section C (Physics).
3. Section A – Questions No. 1 to 16: Q. Nos. 1 to 7 are Multiple Choice Questions of 1 mark each; Q. Nos. 8 and 9 are Assertion–Reason based questions of 1 mark each; Q. Nos. 10 to 12 are Very Short Answer questions of 2 marks each; Q. Nos. 13 and 14 are Short Answer questions of 3 marks each; Q. No. 15 is a case/source-based question of 4 marks and Q. No. 16 is a Long Answer question of 5 marks.
4. Section B – Questions No. 17 to 29: Q. Nos. 17 to 23 are Multiple Choice Questions of 1 mark each; Q. No. 24 is an Assertion–Reason based question of 1 mark; Q. No. 25 is a Very Short Answer question of 2 marks; Q. Nos. 26 and 27 are Short Answer questions of 3 marks each; Q. No. 28 is a case/source-based question of 4 marks and Q. No. 29 is a Long Answer question of 5 marks.
5. Section C – Questions No. 30 to 39: Q. Nos. 30 and 31 are Multiple Choice Questions of 1 mark each; Q. No. 32 is an Assertion–Reason based question of 1 mark; Q. Nos. 33 and 34 are Very Short Answer questions of 2 marks each; Q. Nos. 35 to 37 are Short Answer questions of 3 marks each; Q. No. 38 is a case/source-based question of 4 marks and Q. No. 39 is a Long Answer question of 5 marks.
6. There is no overall choice. However, an internal choice has been provided in some questions. Only one of the alternatives has to be attempted in such questions.
7. Use of calculators is not permitted.

Exam Pattern

Section	Type of Questions	No. of Qs	Marks each	Total Marks
A	Biology (Q1–16): MCQ (7), Assertion–Reason (2), VSA (3), SA (2), Case-based (1), LA (1)	16	–	30
B	Chemistry (Q17–29): MCQ (7), Assertion–Reason (1), VSA (1), SA (2), Case-based (1), LA (1)	13	–	25
C	Physics (Q30–39): MCQ (2), Assertion–Reason (1), VSA (2), SA (3), Case-based (1), LA (1)	10	–	25
	Total	**39**		**80**

Unit-wise Weightage of Marks

Unit	Unit Name	Chapter	Marks
I	Chemical Substances – Nature and Behaviour	Chemical Reactions and Equations; Acids, Bases and Salts; Metals and Non-metals; Carbon and its Compounds	25

Unit	Unit Name	Chapter	Marks
II	World of Living	Life Processes; Control and Coordination; How do Organisms Reproduce?; Heredity	25
III	Natural Phenomena	Light – Reflection and Refraction; The Human Eye and the Colourful World	12
IV	Effects of Current	Electricity; Magnetic Effects of Electric Current	13
V	Natural Resources	Our Environment	5
	Total		**80**

SECTION – A

Section A (Biology) consists of 16 questions: Q. Nos. 1–7 MCQs, 8–9 Assertion–Reason, 10–12 Very Short Answer, 13–14 Short Answer, 15 Case-based and 16 Long Answer.

Q1. The blood glucose level in a patient was very high. It may be due to inadequate secretion of: **[1]**

(a) growth hormone from pituitary gland (b) oestrogen from ovary
(c) insulin from pituitary gland (d) insulin from pancreas

Q2. Bryophyllum produces new plants through: **[1]**

(a) Apical buds formed on the tip of the plant
(b) Vegetative buds produced in the notches of the leaf
(c) Flowers produced in the notches of the branches
(d) Fruits formed on the branches of the plant

Q3. Consider the following two statements:
(i) The trait that expresses itself in the F_1 generation.
(ii) The trait that keeps on passing from one generation to another.
The appropriate terms for statements (i) and (ii) respectively are: **[1]**

(a) Recessive trait, Dominant trait (b) Dominant trait, Recessive trait
(c) Dominant trait, Inherited trait (d) Recessive trait, Inherited trait

Q4. Which of the following is not a role of decomposers in the ecosystem? **[1]**

(a) Natural replenishment of soil.
(b) Enrichment of oxygen in the atmosphere.
(c) Waste decomposition.
(d) Break-down of dead remains.

Q5. During which of the following stages of the circulation of blood in a normal human being is the oxygenated blood pumped to all parts of the body? **[1]**

(a) Contraction of the left atrium (b) Contraction of left ventricle
(c) Relaxation of the right atrium (d) Relaxation of the right ventricle

Q6. Which of the following adaptations in herbivores helps in digestion of cellulose? **[1]**

(a) Longer large intestine (b) Smaller large intestine
(c) Smaller small intestine (d) Longer small intestine

Q7. Generally food is broken down and absorbed within the body of organisms. In which of the following organisms is it done outside the body? **[1]**

(a) Amoeba (b) Mushroom (c) Paramoecium (d) Lice

Q8. **Assertion (A):** Greater number of individuals are present in lower trophic levels.
Reason (R): The flow of energy is unidirectional. **[1]**

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q9. **Assertion (A):** When a bacterium divides into two, and the resultant two bacteria divide again, the four bacteria produced would be almost similar.
Reason (R): DNA copying involves small inaccuracies in the reproduction process. **[1]**

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q10. About 100 acres of forest land was declared a natural reserve park. The following organisms were predomi-

nant: rabbit, frog, grass, fish, fox, water insects, zebra, peacock, snake, trees, bird, owl, insects, tiger, vulture, duck. Create a food web comprising two separate food chains with different producers by using the above data. **[2]**

Q11. The gene for red hair is recessive to the gene for black hair. A child inherits the gene for red hair from the mother and the gene for black hair from the father. Show the genotypes of the parents and the child, and the hair colour of the child, using a flow chart. **[2]**

OR

Sahil crossed tall pea plants (TT) with short pea plants (tt) and obtained all tall plants in the F_1 generation.
(a) What will be the set of genes present in the F_1 generation?
(b) Give reason why only tall plants are observed in the F_1 progeny.

Q12. (A) Due to narrowing of the bile duct, the bile secretion from the liver to the small intestine was obstructed. How will the process of digestion be affected? **[2]**

OR

(B) How does the length of the intestine depend on the nature of food habit in different animals?

Q13. The gene for free earlobe is dominant over the gene for attached earlobe. A man with attached earlobes marries a woman having free earlobes. 50% of their children have free earlobes and 50% have attached earlobes.
(a) Explain the inheritance of this trait and write the trait combinations of the progeny.
(b) Write the gene combinations of the father and the mother in the above case. **[3]**
[Figure: Figure X shows an attached earlobe, where the lobe joins the side of the head; Figure Y shows a free earlobe, where the lobe hangs freely.]

OR

(a) Giving two examples, justify the statement that the sex of the offspring in all animals is not always genetically determined.
(b) Differentiate between the sex chromosomes of male and female human beings.

Q14. How is ozone both beneficial and damaging? How can depletion of the ozone layer be prevented? **[3]**

OR

The flow of energy between various components of the environment has been extensively studied. List three findings.

Case Study: Pond food chain In a pond, algae are eaten by insect larvae. The larvae are eaten by small fish, and small fish are eaten by large fish. A student estimated that the algae store 10000 J of energy. Assume that only 10% of the energy is transferred to the next trophic level at each step.

Q15. Answer the following questions based on the above. **[4]**

(i) Identify the producer in this food chain. [1]

(ii) Name the trophic level of the large fish. [1]

(iii) Calculate the energy available to the large fish, and explain why it is so small compared with the algae. [2]

OR

(iii) Why are food chains rarely longer than four or five trophic levels? Justify. [2]

Q16. (A) Birds and mammals have a four-chambered heart, while fishes have a two-chambered heart. (I) Which heart is present in birds and mammals, and how are they able to maintain their body temperature? Give reasons. (II) Which heart is present in fishes, and how does circulation of blood take place in them? **[5]**

OR

(B) (I) Describe inhalation in humans, mentioning the changes in the ribs, diaphragm and chest cavity. (II) If diffusion alone moved oxygen to the toes it would take years. How is oxygen delivered to all parts of the body?

SECTION – B

Section B (Chemistry) consists of 13 questions: Q. Nos. 17–23 MCQs, 24 Assertion–Reason, 25 Very Short Answer, 26–27 Short Answer, 28 Case-based and 29 Long Answer.

Q17. Four substances A, B, C and D are tested. A: melting point 295 K; conducts electricity well as a solid and also in molten or aqueous state. B: melting point 1210 K; poor conductor as a solid but good conductor in molten or aqueous state. C: melting point 1890 K; poor conductor as a solid but good conductor in molten or aqueous state. D: melting point 1160 K; poor conductor in both states. Which of the substances are ionic compounds? **[1]**

(a) A and B (b) B and C (c) A, B and D (d) A, C and D

Q18. A cable company tests four elements W, X, Y and Z. W: malleable and ductile, conducts electricity, high melting point. X: neither malleable nor ductile, conducts electricity, low melting point. Y: neither malleable nor ductile, conducts electricity, low melting point. Z: malleable and ductile, does not conduct electricity, high melting point. Which elements should the company discard for making electric cables? **[1]**

(a) W, X and Y (b) X, Y and Z (c) W, Y and Z (d) X and Z

Q19. The self-linking property of carbon atoms through covalent bonds to form long chains, branched chains and rings is called: **[1]**

(a) Catenation (b) Tetravalency (c) Isomerism (d) Hydrogenation

Q20. Consider the following four compounds: A: CH_3-CH_3 (ethane) B: $CH_2=CH_2$ (ethene) C: $CH_3-CH_2-CH_3$ (propane) D: $CH_2=CH-CH_3$ (propene) Which statement is correct? **[1]**

(a) A and B are unsaturated hydrocarbons.
(b) C and D are saturated hydrocarbons.
(c) Addition of hydrogen in the presence of a catalyst changes B to A.
(d) Addition of alkaline potassium permanganate changes C to D.

Q21. A metal ribbon X burns in oxygen with a dazzling white flame forming a white ash Y. The correct description of X, Y and the type of reaction is: **[1]**

(a) X = Ca; Y = CaO; type of reaction = decomposition
(b) X = Mg; Y = MgO; type of reaction = combination
(c) X = Al; Y = Al_2O_3; type of reaction = thermal decomposition
(d) X = Zn; Y = ZnO; type of reaction = endothermic

Q22. Select a pair of olfactory indicators from the following: **[1]**

(a) Clove oil and vanilla essence (b) Onion and turmeric
(c) Clove oil and litmus solution (d) Vanilla and methyl orange

Q23. Which is the balanced chemical equation for the reaction between quicklime and water? **[1]**

(a) $2\,CaO + H_2O \longrightarrow 2\,CaOH + H_2 + Heat$ (b) $CaO + H_2O \longrightarrow Ca(OH)_2 + H_2 + Heat$
(c) $CaO + H_2O \longrightarrow Ca(OH)_2 + Heat$ (d) $2\,CaO + 3\,H_2O \longrightarrow 2\,Ca(OH)_3 + O_2 + Heat$

Q24. Assertion (A): A dilute solution of hydrochloric acid conducts electricity.
Reason (R): Hydrogen chloride dissociates into H+ and Cl- ions in water, and these ions carry the electric current. **[1]**

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q25. (a) Silver is recovered from silver nitrate solution by using copper metal. Name the type of reaction and write the chemical equation involved.
(b) Name the method used for refining silver. **[2]**

Q26. What are isomers? "Isomers of the first three members of the alkane series are not possible." Give a reason to justify this statement and draw structures of two isomers of butane, C_4H_{10}. **[3]**

OR

An organic compound X is a liquid at room temperature, a very good solvent, and has the molecular formula C_2H_6O. On oxidation X gives Y, which gives a brisk effervescence with $NaHCO_3$. X reacts with Y in the presence of conc. H_2SO_4 to give a compound Z with a pleasant smell. Identify X, Y and Z, and write chemical equations for the formation of Y and Z.

Q27. Silver chloride kept in a china dish turns grey in sunlight.
(a) Write the colour of silver chloride when it was kept in the china dish.
(b) Name the type of chemical reaction taking place and write the chemical equation for the reaction.
(c) State one use of the reaction. Name one more chemical which can be used for the same purpose. **[3]**

Case Study: The quiz hints In a chemistry quiz, the quiz master gives the following hints about two mystery substances A and F: (i) Substance C is used as a preservative. (ii) C has two carbon atoms and is obtained by the reaction of A in the presence of alkaline potassium permanganate followed by acidification. (iii) Misuse of A in industries is prevented by adding methanol, benzene and pyridine to A. (iv) F is formed on heating A in the presence of conc. sulphuric acid. (v) F reacts with hydrogen gas in the presence of nickel and palladium catalysts.

Q28. Answer the following questions based on the above. **[4]**

(i) Give the IUPAC names of A and F. [1]

(ii) Illustrate with a chemical equation the change A to C. [1]

(iii) Name the chemical reactions which occur in steps (ii) and (v). Identify the compounds formed in these steps if A is replaced by its next homologue. [2]

OR

(iii) Write the chemical equation for the change A to F and name the role of conc. H_2SO_4 in this change. [2]

Q29. (a) State two main reasons for carbon forming a very large number of compounds.
(b) Give reasons why carbon forms compounds (i) mainly by covalent bonding, (ii) having low melting and boiling points.
(c) Write chemical equations for what happens when (i) a piece of sodium is added to ethanol, (ii) ethanoic acid reacts with sodium hydroxide. **[5]**

OR

(a) Explain why carbon forms covalent bonds.
(b) Give two reasons for carbon forming a large number of compounds.
(c) Explain the formation of the ammonia molecule.

SECTION – C

Section C (Physics) consists of 10 questions: Q. Nos. 30–31 MCQs, 32 Assertion–Reason, 33–34 Very Short Answer, 35–37 Short Answer, 38 Case-based and 39 Long Answer.

Q30. Two LED bulbs of 12 W and 6 W are connected in series. If the current through the 12 W bulb is 0.06 A, the current through the 6 W bulb will be: **[1]**

(a) 0.04 A (b) 0.06 A (c) 0.08 A (d) 0.12 A

Q31. The resistance of a resistor is reduced to half of its initial value. If other parameters of the electrical circuit remain unaltered, the amount of heat produced in the resistor will become: **[1]**

(a) Four times (b) Two times (c) Half (d) One fourth

Q32. **Assertion (A):** A person suffering from myopia cannot see the distant objects clearly.
Reason (R): A converging lens is used for the correction of a myopic eye as it can form real as well as virtual images of the objects placed in front of it. **[1]**
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q33. An electric kettle is rated 750 W, 220 V. Can this kettle be used in a circuit with a fuse of current rating 3 A? Give a reason. **[2]**

Q34. Draw the path of a ray of light passing through an equilateral triangular glass prism. Mark on it the angle of incidence and the angle of deviation. **[2]**
[Figure: a triangular prism ABC; an incident ray meets face AB, bends towards the base at the first refraction, travels inside the prism, and emerges from face AC further bent towards the base; the angle between the incident ray and the normal at AB is marked as the angle of incidence, and the angle between the emergent ray and the original incident direction produced backwards is marked as the angle of deviation.]

OR

The angle of deviation of a ray of light passing through a glass prism is 36 degrees and the angle of incidence at the first face is 45 degrees. State, with reason, whether the emergent ray bends towards or away from the original direction of the incident ray.

Q35. (a) What happens when a bundle of soft iron wires is placed inside the coil of a solenoid carrying a steady current? Name the device obtained and say why it is so called. (b) Draw the magnetic field lines inside a current-carrying solenoid. What does this pattern of field lines indicate? **[3]**

OR

In a two-room house, the living room needs one electric bulb, one electric fan, a refrigerator and a plug point for appliances of power up to 2 kW. Draw a circuit diagram (a description in words is acceptable) showing an electric fuse and earthing as safety devices.

Q36. Rohit focused the image of a candle flame on a white screen using a convex lens. The candle, lens and screen were at 26.0 cm, 50.0 cm and 74.0 cm on a scale. (i) What is the focal length of the convex lens? (ii) Where will the image be formed if he shifts the candle to 38 cm? (iii) Draw a ray diagram for case (ii). **[3]**

OR

The image of an object formed by a mirror is real, inverted and of magnification $m = -1$. If the image is 30 cm from the mirror, where is the object placed? Find the image position when the object is moved 20 cm towards the mirror. What is the nature of this image? Justify with a ray diagram.

Q37. A diagram shows a corrective measure for a defect of vision: a convex lens is placed in front of an eye, and rays from a nearby point on the left are converged by this lens so that they focus exactly on the retina. (i) Identify the defect of vision and state the kind of lens used to correct it. (ii) Draw and label a ray diagram showing the defect of vision before correction. **[3]**
[Figure: schematic eye; a convex lens in front of the eye converges rays from a nearby object onto the retina; dashed lines show that without the lens the rays would have met behind the retina.]

OR

(i) What is dispersion of light? (ii) State the condition necessary for dispersion to occur. (iii) Give one cause of presbyopia.

Case Study: Magnetic field of a solenoid A solenoid is a long helical coil of wire through which current is passed to create a magnetic field. The field of the solenoid is the superposition of the fields due to each turn. It is nearly uniform inside the solenoid and close to zero outside, and it resembles the field of a bar magnet, with a north pole at one end and a south pole at the other, depending on the direction of current. A researcher plotted the magnetic field (in mT) against the current (in A) for a solenoid. The graph shows that the field increases with current, and that the increase is non-linear at larger currents.

Q38. Answer the following questions based on the above. **[4]**

(i) What type of energy conversion takes place in a current-carrying solenoid? [1]

(ii) What happens if a soft iron bar is placed inside the solenoid? Give reason. [1]

(iii) Which of the following statements about the graph is correct? (I) B is inversely proportional to the current; (II) B is directly proportional to the current; (III) B is directly proportional to the square of the current; (IV) B is independent of the current. Justify. [2]

OR

(iii) Name two factors on which the magnetic field of a solenoid depends. [2]

Q39. With the help of a labelled circuit diagram, describe an activity to illustrate the pattern of magnetic field lines around a straight current-carrying long conducting wire. (i) Name the rule used to find the direction of the magnetic field associated with the conductor. (ii) Is a similar magnetic field produced around a thin beam of moving (a) alpha particles and (b) neutrons? Justify your answer. **[5]**

OR

(A)(i) Explain why in household circuits only the fuse is connected in series with all the other appliances, while all the appliances are connected in parallel with each other. (ii) An electric heater of power 1500 W and a fan of power 500 W are connected in parallel to a 220 V supply. A fuse rated for 10 A protects the circuit. (a) Calculate the total current drawn by the heater and the fan. (b) Determine whether the 10 A fuse is appropriate for this circuit or whether it will blow.

***** END OF PAPER *****