CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Science

Subject Code: 086 | Class X

Solutions

Sample Question Paper – Set 7

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. In a person the tubular part of the nephron is not functioning at all. What will be its effect on urine formation? **[1]**

(a) The urine will not be formed.
(b) Quality and quantity of urine is unaffected.
(c) Urine is more concentrated.
(d) Urine is more diluted.

Q2. Two healthy potted plants were kept in the dark for 72 hours. Each was then covered with an airtight bell jar. A watch glass containing potassium hydroxide was placed inside jar X but not inside jar Y. Both were kept in light for 6 hours, and an iodine test was done on one leaf from each plant. The set-up is used to show that which of the following is essential for photosynthesis? **[1]**

(a) Chlorophyll (b) Oxygen (c) Carbon dioxide (d) Sunlight

Q3. Which nutrient is absorbed in the small intestine and is also reabsorbed by the kidney tubules? **[1]**

(a) Glucose (b) Cellulose (c) Glycogen (d) Starch

Q4. Walking in a straight line and riding a bicycle are activities which are possible due to coordination of which part of the brain? **[1]**

(a) Fore-Brain - Cerebrum
(b) Mid-Brain - Cerebellum
(c) Hind-Brain - Cerebellum
(d) Hind-Brain - Medulla

Q5. A farmer wants to grow banana plants genetically similar enough to the plants already available in his field. Which one of the following methods would you suggest for this purpose? **[1]**

(a) Regeneration
(b) Budding
(c) Vegetative propagation
(d) Sexual reproduction

Q6. In snails, individuals can begin life as male and, depending on environmental conditions, can become female as they grow. This is because: **[1]**

(a) male snails have dominant genetic makeup.
(b) female snails have dominant genetic makeup.
(c) expression of sex chromosomes can change in a lifetime.
(d) sex is not genetically determined in snails.

Q7. A fish living in a pond ecosystem feeds on small aquatic insects (larvae). These insect larvae, in turn, feed on green algae and small photosynthetic bacteria. In this specific food chain, what is the trophic level classification of fish? **[1]**

(a) Producer
(b) Primary consumer
(c) Secondary consumer
(d) Tertiary consumer

Q8. **Assertion (A):** Chemical transmitters are needed for an impulse to pass from one neuron to the next.
Reason (R): There is a gap called the synapse between the axon end of one neuron and the dendrite of the next neuron. **[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):** Biodegradable substances result in the formation of compost and natural replenishment.
Reason (R): It is due to breakdown of complex inorganic substances into simple organic substances. **[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. Describe the stages of budding in Hydra. **[2]**

Q11. In the following food chain, if 50 J of energy was available to the hawk, how much energy would have been present at the first and third trophic levels? Justify your answer. Grass → Grasshopper → Frog → Snake → Hawk. **[2]**

OR

Use of several pesticides which results in excessive accumulation of pesticides in rivers or ponds, is a matter of deep concern. Justify this statement.

Q12. Fetal cells collected from the amniotic fluid were screened and found to contain an XY pair of sex chromosomes.
(a) What is the sex of the foetus?
(b) How is this prenatal sex determination misused? **[2]**

Q13. Differentiate between asexual and sexual reproduction. Give one example of each. **[3]**

OR

Why is reproduction essential for the survival of a species? Explain briefly.

Q14. Show the cross and the observations made by Mendel when he crossed a pure tall pea plant with a pure short pea plant to get the F_1 progeny. **[3]**

OR

In the above experiment, name the type of cross performed and the number of pairs of contrasting characters studied. Name the plant Mendel used.

Case Study: UV radiation and ozone Ozone in the upper atmosphere absorbs most of the harmful ultraviolet (UV) radiation coming from the sun. Scientists observed that the ozone layer over a region had become thinner over several years. Chlorofluorocarbons (CFCs), used in refrigerators and aerosol sprays, were found to be responsible. People in that region were advised to use sunscreen and to avoid long exposure to the sun.

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

(i) Name the harmful radiation that ozone absorbs. [1]

(ii) Name the group of chemicals responsible for thinning of the ozone layer. [1]

(iii) Explain how ozone is formed in the upper atmosphere. Suggest one step to prevent further depletion. [2]

OR

(iii) Why is thinning of the ozone layer harmful to living beings? Give two effects. [2]

Q16. Explain how the following hormones act. For each: name the gland, state one function and one disorder that results from its deficiency. (a) Insulin; (b) Adrenaline; (c) Thyroxine. **[5]**

OR

Describe the three main regions of the human brain with their functions: fore-brain, mid-brain and hind-brain. Name the two parts of the hind-brain and state the function of each.

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. Which of the following is a redox reaction, but not a combination reaction? **[1]**

(a) $C + O_2 \longrightarrow CO_2$ (b) $2\,H_2 + O_2 \longrightarrow 2\,H_2O$

(c) $2\,Mg + O_2 \longrightarrow 2\,MgO$ (d) $Fe_2O_3 + 3\,CO \longrightarrow 2\,Fe + 3\,CO_2$

Q18. Baking powder is a mixture of: **[1]**

(a) Sodium carbonate + Acetic acid

(b) Sodium carbonate + Tartaric acid

(c) Sodium hydrogen carbonate + Tartaric acid

(d) Sodium hydrogen carbonate + Acetic acid

Q19. To a small amount of copper oxide in a beaker, when dilute hydrochloric acid is added slowly with stirring, the change in colour of the solution is due to the formation of: **[1]**

(a) Copper(II) oxide, which is black in colour

(b) Copper(I) chloride, which is blue in colour

(c) Copper(II) chloride, which is blue-green in colour

(d) Copper(I) oxide, which is black in colour

Q20. The number of electrons in the outermost shell of the atom of a non-metal can be: **[1]**

(a) 1, 2 or 3 (b) 3, 4 or 5 (c) 5, 6 or 7 (d) 5, 6 or 8

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. The molecular formula of the 4th member of the homologous series of alcohols is: **[1]**

(a) $C_4H_{10}O$ (b) C_3H_8O (c) C_4H_8O (d) $C_3H_{10}O$

Q23. A hydrocarbon of formula C_4H_8 belongs to which homologous series? **[1]**

(a) Alkanes (b) Alkenes (c) Alkynes (d) Alcohols

Q24. **Assertion (A):** Dry hydrogen chloride gas does not change the colour of dry blue litmus paper.
Reason (R): Hydrogen ions are produced only in the presence of water, so dry HCl gas has no free H+ ions. **[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. Iron filings are added to four test tubes A, B, C and D containing aqueous solutions of $ZnSO_4$, $CuSO_4$, $FeSO_4$ and $Al_2(SO_4)_3$ respectively. (i) In which test tube will a reaction be observed, and why?
(ii) Write a balanced equation for the reaction involved. **[2]**

Q26. Ethanoic acid and ethanol are kept in two unlabelled bottles in the laboratory. (a) Suggest a chemical test to identify them.
(b) Write the equation for the reaction of ethanoic acid with sodium hydrogen carbonate.
(c) Name the gas evolved and describe how it is tested. **[3]**

OR

(a) Why is pure ethanoic acid known as glacial acetic acid?
(b) What is the concentration of acetic acid solution used as vinegar?
(c) State one use of ethanoic acid other than in vinegar.

Q27. (a) Define the term decomposition reaction. Write one chemical equation each for a decomposition reaction in which energy is supplied in the form of heat, light or electricity.
(b) Decomposition of vegetable matter into compost is considered an exothermic reaction. Why? **[3]**

OR

Why are decomposition reactions called the opposite of combination reactions? Write one chemical equation each for a combination reaction and a decomposition reaction.

Case Study: Two unlabelled bottles In a school laboratory, a lab attendant found two unlabelled bottles, one containing ethanol and the other ethanoic acid. A student was asked to identify them using simple chemical tests.

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

(i) Distinguish between ethanol and ethanoic acid experimentally. [1]

(ii) Give the IUPAC name of the first member of the alkene series, which is formed by removing water from ethanol with conc. sulphuric acid. Illustrate the change with an equation. [1]

(iii) "All combustion reactions are oxidation but all oxidation reactions are not combustion." Justify. [2]

OR

(iii) Write the equation for the reaction of ethanoic acid with sodium carbonate and name the gas evolved. [2]

Q29. A compound A ($C_2H_4O_2$) reacts with sodium metal to form a compound B and evolves a gas which burns with a pop sound. A on treatment with an alcohol C in the presence of an acid forms a sweet-smelling compound D ($C_4H_8O_2$). Addition of NaOH to D gives back B and C. Identify A, B, C and D, and write the reactions involved. **[5]**

OR

The formulae of four organic compounds are given below: A: C_2H_4; B: CH_3COOH; C: C_2H_5OH; D: C_2H_6.
(i) Which one is a saturated hydrocarbon?
(ii) Identify the organic acid and give its structural formula.
(iii) Which compound, heated at 443 K with conc. H_2SO_4, forms ethene? State the role of the acid and write the equation.
(iv) Write the equation for B and C reacting in presence of conc. H_2SO_4; name the product and one use.

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. Which mirror is used by a dentist to examine a small cavity in a patient's tooth? **[1]**

(a) Convex mirror (b) Plane mirror
(c) Concave mirror (d) Any spherical mirror

Q31. Choose the correct option which explains the reason for us to perceive the day sky as blue. **[1]**

(a) As sunlight passes through the atmosphere, shorter wavelengths, such as blue, are scattered more than other colours
(b) The sky appears blue because all colours are scattered equally, but blue light is stronger and more visible to the human eye
(c) The blue colour of the sky is due to longer wavelengths like red and orange scattering more than shorter wavelengths
(d) The atmosphere contains blue-coloured particles that give the sky its blue appearance

Q32. **Assertion (A):** The focal length of the eye lens decreases when we look at objects placed close to the eye.
Reason (R): To focus a nearby object on the retina, the eye lens must become more curved so that it is more converging. **[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. Why is a fuse connected in the live wire, and not in the neutral wire, of a household circuit? **[2]**

OR

Name the wire to which the metallic body of an appliance must be connected, and state what can happen if this connection is missing.

Q34. In a diagram, white light passes through a prism and splits into its component colours; two of the emergent rays are marked, one deviated less (call it P) and one deviated more (call it Q). Name the phenomenon and identify which of the two lights P and Q has the higher wavelength. **[2]**
[Figure: a prism dispersing white light; the less-deviated emergent ray is marked P and the more-deviated emergent ray is marked Q.]

OR

How will you use two identical prisms so that a narrow beam of white light incident on the first prism emerges out of the second prism as white light? Draw the arrangement.

Q35. (a) State the right-hand thumb rule and describe how it helps determine the direction of the magnetic field around a current-carrying conductor. (b) Explain how the magnetic field changes with distance from the conductor. **[3]**

OR

State Fleming left-hand rule. Using it, find the direction of force on a current-carrying wire placed in a magnetic field directed vertically upward, with the current flowing from west to east.

Q36. (i) Explain why the refractive index of any material with respect to air is always greater than 1. (ii) A light ray travels from air into a semicircular plastic block along a radius. Why does the ray not deviate at the curved surface? (iii) Draw the path of the ray when it comes out of the block through its flat face into air. **[3]**

OR

The refractive index of water with respect to air is 1.33 and that of diamond is 2.42. (i) In which medium does light move faster, water or diamond? (ii) What is the refractive index of diamond with respect to water?

Q37. A diagram shows an eye defect in which the rays coming from a distant object are converged by the eye lens before they reach the retina. (a) Name the eye defect and state where the image is formed with respect to the retina. (b) List two causes of this defect. (c) With the help of a diagram, show how this defect of vision is corrected. **[3]**
[Figure: schematic myopic eye; parallel rays from a distant object converge in front of the retina; correction: a concave lens before the eye diverges the rays so that the eye focuses them on the retina.]

OR

(a) State what happens to the image of a distant object in a hypermetropic eye. (b) Give two causes of hypermetropia. (c) Name the corrective lens and explain how it works.

Case Study: Automatic door-locking system A school has installed an automatic electromagnetic door-locking system at the main entrance. The locking mechanism uses a solenoid controlled by a switch at the security desk. When current flows through the solenoid, it creates a magnetic field strong enough to pull an iron bolt, unlocking the door. When the switch is turned off, the magnetic field disappears and a spring pushes the bolt back, locking the door.

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

(i) Why is an iron core kept inside the solenoid in this locking mechanism? [1]

(ii) How can the magnetic poles of this solenoid be determined? [1]

(iii) If the current in the solenoid is increased from 1 A to 2 A, explain how the magnetic effect changes and its effect on unlocking the door. [2]

OR

(iii) If the source of current is fixed, how can the magnetic field in the solenoid be increased? [2]

Q39. (a) A straight conductor XY carries current from X to Y, with X on the left and Y on the right, lying in the plane of the paper. An electron enters a uniform magnetic field directed into the plane of the paper, moving towards the right in the plane of the paper. (i) Copy the diagram and draw the magnetic field lines around the conductor XY when current flows from X to Y. (ii) Name and state the rule used to determine the direction of the magnetic field lines. (iii) State Fleming left-hand rule. Using it, determine the direction of the force on the electron. **[5]**

OR

(b) (i) Define solenoid. Draw the pattern of magnetic field lines in and around a current-carrying straight solenoid, marking the direction of current, the direction of field lines near the ends, and the region where the field is uniform. (ii) How would you make an electromagnet using a current-carrying solenoid?

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