CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Science

Subject Code: 086 | Class X

Solutions

Sample Question Paper – Set 2

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. Select the group in which all organisms have the same mode of nutrition. **[1]**
(a) Cuscuta, yeast, legumes, leeches and tapeworm
(b) Cactus, ticks, lice, leeches and cow
(c) Cuscuta, ticks, lice, leeches and tapeworm
(d) Cactus, grass, lice, lion and tapeworm

Q2. Which of the following is a correct combination of function and part of the brain? **[1]**
(a) Posture and balance: Cerebrum
(b) Salivation: Medulla in midbrain
(c) Hunger: Pons in hindbrain
(d) Blood pressure: Medulla in hindbrain

Q3. The number of chromosomes in parents and offsprings of a particular species undergoing sexual reproduction remains constant due to: **[1]**
(a) Doubling of chromosomes after zygote formation.
(b) Halving of chromosomes after zygote formation.
(c) Doubling of chromosomes before gamete formation.
(d) Halving of chromosomes at the time of gamete formation.

Q4. A cross between a pea plant with white flowers (vv) and a pea plant with violet flowers (VV) gives F_1 progeny, which are then self-pollinated. The ratio of violet to white flowers in the F_2 progeny will be: **[1]**
(a) 1 : 1 (b) 2 : 1 (c) 3 : 1 (d) 1 : 3

Q5. Which of the following features relates to biodegradable substances? **[1]**
(a) Broken down by biological processes
(b) Remain inert in the environment
(c) Persist in the environment for a long time
(d) May harm the ecosystem

Q6. Which of the following options indicates the products formed after breakdown of glucose in our muscle cells when there is lack of oxygen? **[1]**
(a) Ethanol + carbon dioxide + energy
(b) Lactic acid + energy
(c) Lactic acid + carbon monoxide + energy
(d) Carbon dioxide + water + energy

Q7. During cellular oxidation of glucose, ATP is produced along with other products. Which of the following events is associated with production of the maximum number of ATP molecules per molecule of glucose? Synthesis of **[1]**
(a) ethanol in yeast
(b) lactic acid in muscle cells
(c) carbon dioxide in yeast cells
(d) carbon dioxide in human cells

Q8. **Assertion (A):** Blood thyroxine level is controlled by a feedback mechanism.
Reason (R): The pituitary gland changes its secretion of TSH according to the level of thyroxine in the blood. **[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):** Food chain is responsible for the entry of harmful chemicals in our bodies.
Reason (R): The length and complexity of food chains vary greatly. **[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. In a flowering plant, summarise the events that take place after fertilisation. **[2]**

Q11. Study the food chain: Leaf → Caterpillar → Chameleon → Snake → Mongoose. (a) If the amount of energy available at the third trophic level is 100 joules, how much energy will be available at the producer level? Justify your answer.
(b) Is it possible to have 2 more trophic levels in this food chain just before the fourth trophic level? Justify your answer. **[2]**

OR

Spraying of pesticide on a cabbage farm: a food chain in the farm is cabbage (plant) → rabbit → snake → owl. What impact will the pesticide have on humans if they occupy the last trophic level? Explain.

Q12. Mendel crossed a pure tall pea plant (TT) with a pure short pea plant (tt) and obtained all tall plants in the F_1 generation.
(a) What is the gene combination present in the plants of the F_1 generation?
(b) Give reason why only tall plants are observed in the F_1 progeny. **[2]**

OR

What will be the ratio of the plants obtained in the F_2 generation when the F_1 plants are self-pollinated? Give both the phenotypic and the genotypic ratio.

Q13. List any four methods of contraception used by humans. How does the use of three of these methods have a direct effect on the health and prosperity of a family? **[3]**

OR

List two functions each of the following parts of the human female reproductive system: (a) ovaries (b) fallopian tubes (c) uterus.

Q14. Mendel crossed pure tall pea plants (TT) with pure short pea plants (tt) and obtained F_1 progeny. When the F_1 plants were self-pollinated, F_2 progeny were obtained.
(a) What did the F_1 progeny look like? Give their gene combination.
(b) Why could the gene for shortness not be expressed in the F_1 progeny?
(c) Write the ratio of the plants obtained in the F_2 progeny and state the conclusion that can be drawn from this experiment. **[3]**

OR

Explain why the F_2 generation shows a $3:1$ phenotypic ratio, using the segregation of alleles during gamete formation.

Case Study: Inheritance and variation in sexual reproduction The most obvious outcome of the reproductive process is the generation of individuals of similar design, but in sexual reproduction they may not be exactly alike. The resemblances as well as differences are marked. The rules of heredity determine the process by which traits and characteristics are reliably inherited. Many experiments have been done to study the rules of inheritance. Mendel, the father of genetics, performed these experiments on pea plants.

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

(i) Why is an offspring of a human being not a true copy of its parents in sexual reproduction? [1]

(ii) While performing experiments on inheritance in plants, what is the difference between the F_1 and the F_2 generation? [1]

(iii) Study Mendel's cross between RRYY (round yellow) and rryy (wrinkled green) plants. Which of the four F_2 combinations are new? Why do new features that are not present in the parents appear in the F_2 generation? [2]

OR

(iii) Explain why the phenotypic ratio of the F_2 generation of this dihybrid cross is 9 : 3 : 3 : 1. [2]

Q16. (a) Draw the diagram of the female reproductive system and mark: (i) the part where a block is created surgically to prevent fertilisation, (ii) the part where Copper-T is inserted, (iii) the part inside which a female condom can be placed.

(b) Why do more and more people prefer to use condoms? What is the principle behind the use of condoms? **[5]**

[Figure: Outline of the human female reproductive system showing ovary, fallopian tube, uterus, cervix and vagina, to be drawn and labelled by the candidate.]

OR

(i) Describe the various steps involved in the process of binary fission with the help of a diagram.

(ii) Why do multicellular organisms use a complex way of reproduction?

[Figure: Labelled stages of binary fission in amoeba: nucleus duplicates, nuclei separate, cytoplasm divides, two daughter cells.]

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. Sodium hydroxide is termed an alkali while ferric hydroxide is not because: **[1]**

(a) Sodium hydroxide is a strong base, while ferric hydroxide is a weak base.

(b) Sodium hydroxide is a base which is soluble in water, while ferric hydroxide is insoluble in water.

(c) Sodium hydroxide is a strong base while ferric hydroxide is a strong acid.

(d) Both are strong bases, but sodium hydroxide is more soluble in water than ferric hydroxide.

Q18. Which of the following metals does NOT evolve hydrogen gas when treated with dilute hydrochloric acid? **[1]**

(a) Copper (b) Iron (c) Magnesium (d) Zinc

Q19. A magnesium ribbon is dropped into a test tube containing dilute hydrochloric acid. It starts floating on the surface. Which statement gives the correct reason for the floating? **[1]**

(a) Magnesium is lighter than dilute hydrochloric acid.

(b) Magnesium reacts with dilute hydrochloric acid to produce H_2 gas which helps it float.

(c) Magnesium reacts with dilute hydrochloric acid to produce N_2 gas which helps it float.

(d) Magnesium reacts with dilute hydrochloric acid to produce CO_2 gas which helps it float.

Q20. Which of the following is not observed in a homologous series? **[1]**

(a) Change in chemical properties

(b) Difference of $-CH_2$ and 14 u molecular mass

(c) Gradation in physical properties

(d) Same functional group

Q21. The process of converting vegetable oil into vegetable ghee is: **[1]**

(a) Hydrogenation (b) Esterification (c) Substitution (d) Dehydration

Q22. When aqueous solutions of potassium iodide and lead nitrate are mixed, an insoluble substance separates out. The chemical equation for the reaction involved is: **[1]**

(a) $KI + PbNO_3 \longrightarrow PbI + KNO_3$
(b) $2\,KI + Pb(NO_3)_2 \longrightarrow PbI_2 + 2\,KNO_3$
(c) $KI + Pb(NO_3)_2 \longrightarrow PbI + KNO_3$
(d) $KI + PbNO_3 \longrightarrow PbI_2 + KNO_3$

Q23. The name of the salt used to remove permanent hardness of water is: **[1]**
(a) $NaHCO_3$, sodium hydrogen carbonate
(b) NaCl, sodium chloride
(c) $Na_2CO_3 \cdot 10\,H_2O$, sodium carbonate decahydrate
(d) Calcium sulphate hemihydrate (Plaster of Paris)

Q24. **Assertion (A):** Reaction of quicklime with water is an exothermic reaction.
Reason (R): Quicklime reacts vigorously with water releasing a large amount of heat. **[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. Give a test that can be used to confirm the presence of carbon in a compound. With a valency of 4, how is carbon able to attain noble gas configuration in its compounds? **[2]**

OR

The number of carbon compounds is more than those formed by all other elements put together. Justify the statement by giving two reasons.

Q26. A reddish-brown metal X, when heated in air, gives a black compound Y. Y on heating in the presence of hydrogen gives X back. X is refined by electrolysis and the refined form is used in electrical wiring. Identify X and Y. Draw a well-labelled diagram of the electrolytic refining of X. **[3]**

OR

Two metal oxides, aluminium oxide and magnesium oxide, are given without labels. Suggest a test to identify and label them.

Q27. An organic compound X (C_2H_6O) is used to blend with petrol and as a solvent in medicines such as tincture iodine, cough syrups and tonics. (a) Draw the electron dot structure of X.
(b) Write the name and formula of the next homologue of X.
(c) Write the reaction of X with acetic acid to form a sweet-smelling substance. **[3]**

OR

Ramya heats ethanol with conc. H_2SO_4 at 170 °C to get product A, then passes hydrogen over A with nickel catalyst to get product B. Name A and B and write both reactions.

Case Study: Heat conduction in metals Aavya and Vihan want to compare how well metals conduct heat. They fix rods of aluminium, silver, copper, iron and zinc, all of equal length and thickness, to a central point. A small candle is fixed at the far end of each rod. The central point is heated with a burner and the time taken for each candle to drop is noted. The results show that silver takes about 10 seconds, copper 15 seconds, aluminium 30 seconds, zinc 50 seconds and iron 60 seconds. A gold rod, which conducts heat better than aluminium but not as well as copper, is also considered.

[Figure: Five metal rods of equal length and thickness are fixed to a central point heated by a burner; each rod carries a candle at its far end. A bar graph titled Time taken for the candle to drop shows silver 10 s, copper 15 s, aluminium 30 s, zinc 50 s and iron 60 s.]

Q28. Answer the following questions based on the above. **[4]**
(i) On the basis of the graph, which metal is the best conductor of heat? [1]

(ii) If one rod were made of gold, the time for its candle to drop would be: (i) 15 s (ii) 20 s (iii) 35 s (iv) 10 s. Choose the correct value and justify. [1]

(iii) If the length of all the rods is increased by 20 per cent without any change in thickness, will the time for the candles to drop be affected? Explain. [2]

OR

(iii) If one rod is thicker than the others but of the same length, how would the time for its candle to drop change? Explain. [2]

Q29. (a) What is the reactivity series? How does it help in predicting the relative activities of metals?
(b) Suggest the chemical processes used for obtaining a metal from its oxides for metals in the middle of the reactivity series and for metals at the top. Support your answer with one example each. **[5]**

OR

(a) Describe an experiment to show that metals are good conductors of heat.
(b) Describe the extraction of mercury from its ore cinnabar (HgS).

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. When light from the Sun enters the atmosphere, it strikes extremely fine particles, which deflect the rays of light in all possible directions. This is due to **[1]**

(a) reflection of light
(b) atmospheric refraction
(c) scattering of light
(d) dispersion of light

Q31. In a resistive circuit, if the current is increased to two times, the percentage change in the amount of heat dissipated in the circuit would be: **[1]**

(a) 400% (b) 300% (c) 200% (d) 100%

Q32. Assertion (A): Nichrome is an alloy which is commonly used in electrical heating devices such as electric irons, toasters, etc.
Reason (R): The resistivity of nichrome is high and its resistance decreases with increase in temperature.**[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 object of height 1.2 m is placed in front of a concave mirror of focal length 20 cm so that a real image is formed 60 cm from the mirror. Find the position of the object and the height of the image. **[2]**

Q34. A current-carrying solenoid has magnetic field lines that are closely spaced near its two ends. (a) What does this pattern indicate about the magnetic field? (b) What happens to the magnetic field when the current in the solenoid is reversed? **[2]**

OR

Two fuse wires, A and B, have current ratings of 2 A and 5 A respectively. Which one would you use with a 1000 W, 220 V room heater? Justify your choice.

Q35. Two lamps, one rated 100 W at 220 V and the other 200 W at 220 V, are connected (i) in series and (ii) in parallel to the 220 V mains. Find the current drawn in each case. **[3]**

OR

Find the resistance of each lamp when it is operating at its rated voltage of 220 V.

Q36. (a) Why is alternating current (AC) considered advantageous over direct current (DC) for long distance transmission of electric power? (b) How is the type of current in household supply different from the current given by a battery of dry cells? (c) How does an electric fuse protect the circuit and appliances from damage due to short circuiting or overloading? **[3]**

OR

(a) A straight cylindrical conductor is suspended with its axis perpendicular to the magnetic field of a horse-shoe magnet. When a current is passed, it is displaced towards the left. What happens to the displacement if (i) the current is increased, (ii) a stronger horse-shoe magnet is used, (iii) the direction of current is reversed? Name and state the rule for the direction of force on a current-carrying conductor.

Q37. A student has to project a three times magnified image of a candle flame on a wall. Name the type of lens required. If the candle flame is 6 m from the wall, find the focal length of the lens. **[3]**

OR

A convex lens of focal length 20 cm forms a real image. Where should the object be placed so that the image is of the same size as the object? State the nature of the image.

Case Study: Heating near a refrigerator Swati, a Class 10 student, observes that when she passes close to the refrigerator in her kitchen, she feels the heat, although the things kept inside the refrigerator are cool.

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

(i) (a) Describe the cause of heating in the above-mentioned case. [1]

(ii) (b) A current I flows through a resistor of resistance R when the potential difference across it is V. Applying Ohm's law, write the formula for the heat produced by the resistor in time t. [1]

(iii) (c) (i) Write any two practical applications of the heating effect of electric current. [2]

OR

(iii) (c) (ii) Define the commercial unit of electric energy and express it in joules (J). [2]

Q39. A conductor has resistance R, length L, thickness d and resistivity ρ. (i) The conductor is cut into four equal parts. What will be the new resistivity of each part? Why?
(ii) Find the resistance of the four parts when connected (a) in parallel and (b) in series.
(iii) For a given voltage, which combination consumes more power, and why? **[5]**

OR

If the thickness d of the original conductor is doubled, with L and ρ unchanged, what is its new resistance in terms of R? Give the reason.

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