

**QUESTION BANK**  
**Class X**  
**Subject: SCIENCE**

## Objective Type Questions

### Very Short Answers

1. Why does not a wall immediately acquire a white colour when a coating of slaked lime is applied on it ?
2. Define displacement reaction with one example.
3. Identify the most reactive and least reactive metal : Al, K, Ca, Au.
4. Which of the following is a combination reaction and which is a displacement reaction ?  
(a)  $\text{Cl}_2 + 2\text{KI} \longrightarrow 2\text{KCl} + \text{I}_2$   
(b)  $2\text{K} + \text{Cl}_2 \longrightarrow 2\text{KCl}$ .
5. What is the difference between the following two reactions ?  
(a)  $\text{Mg} + 2\text{HCl} \longrightarrow \text{MgCl}_2 + \text{H}_2$   
(b)  $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$ .
6. Identify the compound which is oxidised in the following reaction  
 $\text{H}_2\text{S} + \text{Br}_2 \longrightarrow 2\text{HBr} + \text{S}$ .
7. What happens chemically when quick lime is added to water ?
8. Give an example of exothermic reaction.
9. Give an example of endothermic reaction.
10. Name the gas that can be used for the storage of fresh sample of chips for a long time.
11. Name the type of reaction  
 $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \longrightarrow 2\text{NH}_3(\text{g})$
12. Give an example of a double displacement reaction (only reaction with complete balanced equation).
13. Why are decomposition reactions called the opposite of combination reactions ? Write equations for these reactions.
14. In the reaction  $\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$ ; identify which one is reduced and which one is oxidized ?.

15. Take a small amount of calcium oxide or quick lime in a beaker and slowly add water to this. Is there any change in temperature ?
16. Name two salts that are used in black and white photography.
17. State the chemical change that takes place when lime stone is heated
18. What type of lens is used to correct (a) Hypermetropia, (b) Myopia ?
19. Name the defect of vision in which the eye-lens loses its power of accommodation due to old age.
20. What is the far point of a person suffering from myopia ?
21. What is the other name of old age hypermetropia ?
22. You friend can read a book perfectly well but cannot read the writing on black-board unless she sits on the front row in class. Is she short-sighted or long-sighted ?
23. Which of the two is scattered more easily – light of shorter wavelength or light of longer wavelength ?
24. What is the near and far point of a normal eye ?
25. State two effects produced by the scattering of light by the atmosphere.
26. What is tyndall effect ?
27. Which light has longer wavelength – red light or blue light ?
28. What do you understand by dispersion of light ?
29. As light rays pass from air into a glass prism, are they refracted towards or away from the normal ?
30. Define S.I. unit of :
- (a) Electric current
  - (b) Potential difference
  - (c) Resistance
  - (d) Electric power
  - (e) Electrical energy consumed
31. Define the term resistivity.
32. Device used for measuring the current is.....
33. Name the element of filament of a bulb.

34. Write two types of resistors combination.
35. Define magnetic field lines.
36. What is the frequency of a.c. in India ?
37. Who discovered the electromagnetic induction ?
38. What is short circuit ?
39. Why does two magnetic field lines not intersect ?

**40. Fill in the blanks:**

- (i) Image formed by a plane mirror is always ..... and ..... .
- (ii) A spherical mirror, whose reflecting surface is curved inwards, that is, faces towards the centre of the sphere, is called a ..... .
- (iii) The focal length of a spherical mirror is equal to ..... its radius of curvature.
- (iv) Speed of light is ..... .
- (v) Light rays always travels in ..... .

**41. Answer in one word/one sentence.**

- (i) A concave mirror produces three times magnified (enlarged) real image of an object placed at 10 cm in front of it. Where is the image located?
- (ii) The magnification produced by a plane mirror is +1. What does this mean?
- (iii) An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position and nature of the image.
- (iv) Define the principal focus of a concave mirror.

**Multiple Choice Questions**

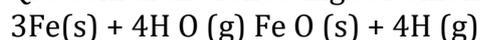
Q. 1 The shiny finish of wall after white wash is because of.

- a) Calcium oxide                      b) Calcium hydroxide  
c) Calcium Carbonate              d) Calcium phosphate

Q. 2 Electrolysis of water is decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is

- a) 1:1    b) 2:1    c) 4:1    d) 1:2

Q. 3 Which the following statements about the given reaction are correct:



- i) Iron metal is getting oxidized  
ii) Water is getting reduced  
iii) Water is acting as reducing agent  
iv) Water is acting as oxidizing agent

- a) (i), (ii) and (iii)                      b) (iii) and (iv)  
c) (i), (ii) and (iv)                      d) (ii) and (iv)

Q. 4 In order to prevent the spoilage of potato chips, they are packed in plastic bags containing the gas

- a) Cl b) O c) N d) H

Q. 5 The process of respiration is -

- a) an oxidation reaction which is endothermic  
b) a reduction reaction which is exothermic  
c) a combination reaction which is endothermic  
d) an oxidation reaction which is exothermic

6. When aqueous solution of sodium sulphate and barium chloride are mixed together, it becomes

- a) turns red  
b) forms a white precipitate  
c) forms yellow precipitate  
d) becomes colourless

7. The colour of ferrous sulphate crystal is

- a) yellow b) light green c) red d) brown

8. A student took solid quick lime in a china dish and added a small amount of water to it. He would hear

- a) pop sound  
b) a crackling sound  
c) hissing sound  
d) no sound at all

9. When an iron nail is placed in copper sulphate solution the observation are as follows-

The solution turns light green

- b) A brown deposit is formed on the nail  
c) Born 'a' and 'b'  
d) None of the above

10. A student obtains a blurred image of a distant object on a screen using a convex lens. To obtain a distinct image on the screen he should move the lens.

- (A) away from the screen  
(B) towards the screen  
(C) to a position very far away from the screen  
(D) either towards or away from the screen depending upon the position of the object. (CBSE-2017)

11. A student focuses the image of a candle flame, placed at about 2 m from a convex lens of focal length 10 cm, on a screen. After that he moves gradually the flame towards the lens and each time focuses its image on the screen.

- (A) In which direction does he move the lens to focus the flame on the screen?  
(B) What happens to the size of the image of the flame formed on the screen?  
(C) What difference is seen in the intensity (brightness) of the image of the flame on the screen?  
(D) What is seen on the screen when the flame is very close (at about 5 cm) to the lens? (CBSE-2017)

## **Assertion Reasoning Based Questions**

1. A gas is produced when conc.  $\text{H}_2\text{SO}_4$  is added to solid sodium chloride taken in a test-tube. The gas coming out through the delivery tube is passed over a dry blue litmus paper.

- I. Blue colour of litmus changes into Red
  - II. Blue colour of litmus does not change into
- i) I is correct
  - ii) II is correct
  - iii) I and II both are correct
  - iv) I and II both are wrong

2. A white coloured powder is used by the doctors for supporting fractured Bones –

- I. It is Plaster of Paris
  - II. It is Gypsum
- i) I is correct
  - ii) II is correct
  - iii) Both I and II are correct
  - iv) Both I and II are wrong

3. Assertion (A): The bottom of a tank or pond, filled with water appears to be raised.

Reason (R): The apparent depth of the tank is given by  $1/n$  times the original depth.

- (a) (A) is incorrect and (R) is correct.
- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (d) Both (A) and (R) are correct but (R) is the correct explanation of (A).

4. Assertion (A): The shaving mirrors are convex mirrors.

Reason (R): Convex mirror always forms a virtual image.

- (a) (A) is incorrect and (R) is correct.
- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (d) Both (A) and (R) are correct but (R) is the correct explanation of (A).

5. Assertion (A): Some persons have the difficulty to see the objects in dim light during night.

Reason (R): Cones respond less to the illumination.

- (a) (A) is incorrect and (R) is correct.
- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (d) Both (A) and (R) are correct but (R) is the correct explanation of (A).

6. Assertion (A): The colour of the clear sky appears blue.

Reason (R): The sky of the moon appears dark.

- (a) (A) is incorrect and (R) is correct.
- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (d) Both (A) and (R) are correct but (R) is the correct explanation of (A).

7. Assertion (A): The fuse wire damages the various appliances in household connections.

Reason (R): Depending on the device/appliance used, the fuse wire of proper thickness has to be used.

- (a) (A) is incorrect and (R) is correct.
- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (d) Both (A) and (R) are correct but (R) is the correct explanation of (A).

8. Assertion (A): When a current  $I$  flows through a resistor  $R$ , heat produced.

Reason (R): The Joule's law of heating says  $H = I^2 R T$ .

- (a) (A) is incorrect and (R) is correct.
- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (d) Both (A) and (R) are correct but (R) is the correct explanation of (A).

9. Assertion (A): Every magnet has two poles—North and South.

Reason (R): Like poles repel each other.

- (a) (A) is incorrect and (R) is correct.
- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (d) Both (A) and (R) are correct but (R) is the correct explanation of (A).

10. Assertion (A): Magnetic field lines never intersect each other.

Reason (R): There must not be two north directions at a point.

- (a) (A) is incorrect and (R) is correct.
- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (d) Both (A) and (R) are correct but (R) is the correct explanation of (A).

11. Assertion (A): As the speed of the coil in the motor increases, there is reduction in the current flowing through it.

Reason (R): During rotation in electric motor, some induced current is produced.

- (a) (A) is incorrect and (R) is correct.
- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
- (d) Both (A) and (R) are correct but (R) is the correct explanation of (A).

## Short Answer Type Questions

1. When potassium Iodide solution is added to a solution of lead nitrate in test tube, a precipitate is formed.

i) State the colour precipitate

ii) Name the compound precipitated

iii) Write balanced equation for chemical reaction (CBSE-2015 Comptt)

2. Decomposition reactions require energy either in form of heat and light or electricity for breaking down of reactions. Write one equation for each type of decomposition reaction where heat, light or electricity is used as form of energy.

3. 2 gm. of silver chloride is taken in china dish, and china dish is placed in sunlight for some time. What will be your observation? Write the balanced chemical equation for above reaction and identify the type of reaction. (CBSE-2019)

4. Identify the type of reactions taking place in each of following cases and write the balanced chemical equation for the reactions.

a) Zn reacts with silver nitrate to produce zinc nitrate and silver.

b) Potassium iodide reacts with lead nitrate to produce potassium nitrate and lead iodide (CBSE-2019)

5. What is redox reaction? Write down a chemical reaction representing it.

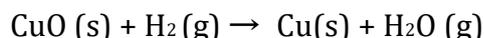
6. In electrolysis of water :

(a) Name the gas collected at cathode and anode.

(b) Why is volume of one gas collected at one electrode is double of another?

(c) Why are few drops of dil.  $\text{H}_2\text{SO}_4$  added to water?

7. In the reaction



(a) Name the oxidized substance.

(b) Name the reduced substance.

(c) Name the oxidizing agent.

8. Give reasons :

(a) White silver chloride turns grey in sunlight.

(b) Brown coloured copper powder on heating in air turns into black coloured substance.

9. Compound 'X' decomposes to form compound 'Y' and  $\text{CO}_2$  gas. Compound Y is used in manufacturing of cement.

(a) Name the compounds 'X' and 'Y'.

(b) Write the chemical equation for this reaction.

10. A metal salt MX when exposed to light splits up to form metal M and gas  $\text{X}_2$ . Metal M is used to make ornaments whereas gas  $\text{X}_2$  is used

in making bleaching powder. The salt MX is used in black & white photography.

(a) Identify the metal M and gas X<sub>2</sub>.

(b) Identify MX.

(c) Write down the chemical reaction when salt MX is exposed to sunlight.

11. A metal strip X is dipped in blue coloured salt solution YSO<sub>4</sub>. After some time a layer of metal 'Y' is formed on metal strip X. Metal X is used in galvanization whereas metal Y is used for making electric wires.

(a) What could be metal 'X' and 'Y' ?

(b) Name the metal salt YSO<sub>4</sub>.

(c) What type of chemical reaction takes place between X and YSO<sub>4</sub>?

12. Write the balanced chemical equation.

Refractive indices of medium A, B and C are 1.3, 1.5 and 1.4 respectively.

In which of the following the speed of light will be the :

(a) fastest ?

(b) slowest ?

13. If the image formed by a spherical mirror for all positions of the object placed in front of it is always erect and diminished, what type of mirror is it ? Draw a labelled ray diagram to support your answer.

(CBSE-2018)

14. State the laws of refraction of light. Explain the term 'absolute refractive index of a medium' and write an expression to relate it with the speed of light in vacuum. (CBSE-2018)

15. What is meant by power of a lens? Write its SI unit. A student uses a lens of focal length 40 cm and another of -20 cm. Write the nature and power of each lens. (CBSE-2018)

16. An object is placed at a distance of 15 cm from a concave lens of focal length 30 cm. List four characteristic (nature, position, etc.) of the image formed by the lens. (CBSE-2017)

17. "A lens can form a magnified erect image as well as magnified inverted image of an object placed in front of it". State the nature of this lens and draw ray diagrams to justify the above statement. Mark the positions of O, F and 2F in the diagram. (CBSE-2017)

18. Differentiate between Hypermetropia and Myopia.

19. What is presbyopia ? Write two causes of this defect. Name the type of lens which can be used to correct presbyopia.

20. The near point of a person suffering from hypermetropia is at 50 cm from his eye. What is the nature and power of the lens needed to correct this defect ?

21. How is the amount of light entering the eye controlled ?

22. Why do stars twinkle at night ?
23. Describe the formation of rainbow in the sky with the help of a diagram.
24. Why the sun appear red while sunset and sunrise ? Explain.
25. Why do stars seem higher than they actually are ? Illustrate your answer with the help of a diagram.
26. How the voltmeter and ammeter are connected in a circuit ?
27. Why the filament of bulb has high melting point ?
28. How does fuse wire protect electrical appliances ?
29. Find the number of joules in 1 KWh.
30. Find a relationship between P, I and V.
31. On what factors does resistance of a conductor depend ?
32. State Ohm's law. Derive relation between I, V and R. Draw the graph between V and I.
33. What is Joule's heating effect of current P ? Derive its expression.
34. What would be new resistance if length of conductor is doubled and thickness is halved ?
35. Which is the better way to connect lights and other appliances in domestic wiring and why ?
36. When does short circuit occur ?
37. Write the three ways to produce magnetic field.
38. What is overloading ?
39. Write the use of safety device used in electric circuit.
40. What is solenoid ? Where the magnetic field is uniform in solenoid ?
41. Draw the pattern of magnetic field lines due to current carrying straight conductor.
42. What is earth wire ? How it works in our domestic circuit ?

## Long Answer type Questions

1. White wash was being done at Mukesh's house. Mukesh saw that the painter added quick lime to drum having water. Mukesh touched outer surface of drum, it is unbelievably hot.

(a) Write the chemical equation for above reaction.

(b) What type of reaction is it ?

(c) What is utility of this reaction ?

2. What types of reactions are represented by following :

(a)  $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$

(b)  $2\text{Ca} + \text{O}_2 \rightarrow 2\text{CaO}$

(c)  $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$

(d)  $2\text{FeSO}_4 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$

(e)  $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaCl}_2 + 2\text{NaCl}$

3. Balance the following equations :

(a)  $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$

(b)  $\text{MnO}_2 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{H}_2\text{O} + \text{Cl}_2$

(c)  $\text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbO} + \text{NO}_2 + \text{O}_2$

(d)  $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$

(e)  $\text{Ca}(\text{OH})_2 + \text{HNO}_3 \rightarrow \text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O}$

4. Write down the balanced chemical equation for the following :

(a) Silver chloride is decomposed in presence of sunlight to give silver and chlorine gas.

(b) Calcium oxide reacts with water to give lime water.

(c) Sodium hydroxide reacts with hydrochloric acid to give sodium chloride and water.

(d) Dil hydrochloric acid is added to copper oxide to give green coloured copper chloride and water.

(e) Solution of barium chloride and sodium sulphate in water reacts to give insoluble barium sulphate and solution of sodium chloride.

5. A compound lens is made up of two thin lenses having power + 12.5 D and - 2.5 D. Find the focal length and power of the combination.

6. Light enters from air to kerosene having a refractive index of 1.47. What is the speed of light in kerosene ?

7. A 5 cm tall object is placed perpendicular to principal axis of a convex lens of focal length 10 cm. If the object is placed 30 cm away from the lens, find the position, size and nature of image.

8. One half of a convex lens is covered with black paper.

(a) Show the formation of image of a object placed at 2F, of such covered lens with the help of ray diagram. Mention the position and nature of the image.

(b) Draw the ray diagram for same object at same position in front of

the same lens, but now uncovered. Will there be any difference in image obtained in the two cases ? Give reasons for your answers.

9. A thin converging lens forms a (i) real magnified image, (ii) virtual magnified image.

(a) Write the position of object in each case.

(b) Draw labelled diagram for each case.

10. (a) What happens to a ray of light when it travels from one medium to another having equal refractive indices ?

(b) State the cause of refraction of light.

11. (a) Define 1 dioptre of power. Find the focal length of a lens of power – 2.0 D.

(b) Why does a lemon kept in water in a glass tumbler appear to be bigger than actual size ?

12. A ray travelling in water enters obliquely into glass. Does the light bend towards or away from the normal and why ?

13. An object is placed at the focus of a convex lens. Draw ray diagram to locate the position of image formed.

14.(a) What happens to the size of pupil of our eye in (i) dim light, (ii) bright light ?

(b) Name the cells on the retina sensitive to (i) bright light, (ii) dim light.

15. (a) Draw a simple diagram of the human eye and label clearly the cornea, iris, pupil, ciliary muscles, eye lens, retina and optic nerve.

(b) Describe the working of the human eye with the help of the above diagram.

16. What is short sightedness ? State the two causes of short-sightedness. With the help of ray diagrams, show :

(a) the eye defect short sightedness.

(b) correction of short sightedness by using a lens.

17. What is atmospheric refraction ? What causes atmospheric refraction ?

18. Draw a neat and labelled diagram of the experimental set-up for observing the scattering of light in a colloidal solution of sulphur to show how the sky appears blue and the sun appears red at sunrise and sunset.

19.Explain the Joule's law of heating. How and on what factors does the heat produced in a conductor depends ?

20. In the circuit given below, calculate :

(a) Total effective resistance.

(b) Potential difference across  $4\Omega$ ,  $2\Omega$ .

21.What is electromagnetic induction ? Explain with an activity. Write its one application.

22. Draw the schematic diagram of domestic circuit. Write the colour and nature of neutral wire, live wire and earth wire.

23. What is an electromagnet ? What material are used to make electromagnet ?  
Can we use steel to make electromagnet ?

**Class-X Science**  
**Chapter-3 : Metals and Non-metals**

**Objective Type Questions : MCQs , Very Short Answer type**

1. Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same?
  - (i) Good thermal conductivity
  - (ii) Good electrical conductivity
  - (iii) Ductility
  - (iv) High melting point
  - a. (i) and (ii)
  - b. (i) and (iii)
  - c. (ii) and (iii)
  - d. (i) and (iv)
  
2. The most abundant metal in the earth's crust is
  - a. Iron
  - b. Aluminium
  - c. Calcium
  - d. Sodium
  
3. The poorest conductor of heat among metals is
  - a. Lead
  - b. Mercury
  - c. Calcium
  - d. Sodium
  
4. Which property of metals is used for making bells and strings of musical instruments like Sitar and Violin?
  - a. Sonorous
  - b. Malleability
  - c. Ductility
  - d. Conductivity
  
5.  $\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightarrow \dots\dots + \text{H}_2\text{O}$ 
  - a.  $\text{Al}(\text{OH})_3$
  - b.  $\text{Na}_2\text{O}$
  - c.  $\text{NaAlO}_2$
  - d.  $\text{AlNaO}_2$
  
6. Which of the following is the correct arrangement of the given metals in ascending order of their reactivity?  
Zinc, Iron, Magnesium, Sodium
  - a. Zinc > Iron > Magnesium > Sodium
  - b. Sodium > Magnesium > Iron > Zinc
  - c. Sodium > Zinc > Magnesium > Iron
  - d. Sodium > Magnesium > Zinc > Iron
  
7. Which of the following pairs will give displacement reactions?
  - a.  $\text{FeSO}_4$  solution and Copper metal
  - b.  $\text{AgNO}_3$  solution and Copper metal
  - c.  $\text{CuSO}_4$  solution and Silver metal
  - d.  $\text{NaCl}$  solution and Copper metal

8. Non-metals form covalent chlorides because
- they can give electrons to chlorine
  - they can share electrons with chlorine
  - they can give electrons to chlorine atoms to form chloride ions
  - they cannot share electrons with chlorine atoms
9. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?
- FeO
  - Fe<sub>2</sub>O<sub>3</sub>
  - Fe<sub>3</sub>O<sub>4</sub>
  - Fe<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>4</sub>
10. Which of the following are not ionic compounds?
- KCl
  - HCl
  - CCl<sub>4</sub>
  - NaCl
- (i) and (ii)
  - (ii) and (iii)
  - (iii) and (iv)
  - (i) and (iii)
11. The electronic configuration of three elements X, Y and Z are as follows:  
 X = 2, 4, Y = 2, 7, Z = 2, 1 Which two elements will combine to form an ionic compound and write the correct formula,
- X<sub>2</sub>Y
  - YZ
  - XZ<sub>3</sub>
  - ZY
12. Reaction between X and Y forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?
- Has high melting point
  - Has low melting point
  - Conducts electricity in molten state
  - Occurs as solid
13. An element X is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element.
14. The electronic configurations of three elements X, Y and Z are  
 X ---2, 8; Y -- 2, 8, 7 and Z --- 2, 8, 2. Which of these are metals and non-metals ?
15. Write two metals which are poor conductors of heat .
16. A non-metal which is a good conductor of electricity.
17. How can a metal form positive ions ?

18 Name a non-metal which is lustrous .

19 Name two metals which are found in nature in the free state.

20 Identify the most reactive and the least reactive metal amongst the following : Al , K , Cu , Ag , Au , Na

### Assertion Reason type of Questions :

**In the following questions a statement of Assertion is followed by a statement of Reason. Mark the correct choice as**

- If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- If Assertion is true but Reason is false.
- If Reason is true but Assertion is false.

I. **Assertion(A):** Iron can be obtained from  $\text{Fe}_2\text{O}_3$  by reduction with aluminium.

**Reason (R) :** The process is known as thermite process.

II. **Assertion(A):** Elements Pt, Ag, noble gases, etc. occur in native state in nature.

**Reason (R):** Elements which are attacked by moisture, oxygen and  $\text{CO}_2$  of air occur in native state.

III. **Assertion(A):** Reactivity Series is an arrangement of element based on their reactivity.

**Reason (R):** Reactivity Series is used to separate elements based on their reactivity.

IV. **Assertion(A):** Aluminium forms amphoteric oxide.

**Reason (R) :** It's oxides show both acidic and basic properties.

### Short Answer Type Questions :

- Why are metals called electropositive elements whereas non-metals are called electronegative elements ?
- What changes in the colour of iron nails and copper sulphate solution do you observe after keeping the iron nails dipped in copper sulphate solution for about 30 minutes ?
- What is aqua-regia ? Name two special metals which are insoluble in common reagents but dissolve in aqua-regia.
- A copper coin is kept immersed in a solution of silver nitrate for some time. What will happen to the coin and the colour of the solution ?
- What will happen if a strip of zinc is immersed in a solution of copper sulphate ?
- How would you show that silver is chemically less reactive than copper ?
- Which property of graphite is utilised in making electrodes ?
- What is meant by saying that the metals are malleable and ductile ? Explain with examples.
  - Name two metals which are both malleable and ductile.
  - Which property of iron metal is utilised in producing iron sheets required for making buckets ?

9. Name two metals which react violently with cold water. Write any three observations you would make when such a metal is dropped into water. How would you identify the gas evolved, if any, during the reaction ?
10. a. With the help of examples, describe how metal oxides differ from non-metal oxides.  
b. Which of the given elements (Na, S, C, K, H) would yield : (i) an acidic oxide, (ii) a basic oxide, and (iii) a neutral oxide ?
11. a. What are amphoteric oxides ? Give two examples of amphoteric oxides.  
b. Choose the acidic oxides, basic oxides and neutral oxides from the following :  
Na<sub>2</sub>O , CO<sub>2</sub> , CO , SO<sub>2</sub>, MgO , N<sub>2</sub>O , H<sub>2</sub>O.  
c. Which of the following are amphoteric oxides : MgO, ZnO, P<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>, NO<sub>2</sub>
12. a. What is the nature of the oxide SO<sub>2</sub> ? What happens when it is dissolved in water ? Write the chemical equation of the reaction involved.  
b. What is the nature of the oxide Na<sub>2</sub>O ? What happens when it is dissolved in water ? Write the chemical equation of the reaction involved.
13. Explain why, metals usually do not liberate hydrogen gas with dilute nitric acid. Name two metals which can, however, liberate hydrogen gas from very dilute nitric acid.
14. a. Why does aluminium not react with water under ordinary conditions ?  
b. Name two metals which can displace hydrogen from dilute acids.  
c. Name two metals which cannot displace hydrogen from dilute acids.
15. a. Why is sodium kept immersed in kerosene oil ?  
b. Why is white phosphorus kept immersed under water ?  
c. Can we keep sodium immersed under water ? Why ?

### Long Answer Type Questions

1. You are given samples of three metals — sodium, magnesium and copper. Suggest any two activities to arrange them in order of their decreasing reactivity.
2. a. Write one reaction in which aluminium oxide behaves as a basic oxide and another in which it behaves as an acidic oxide.  
b. What special name is given to substances like aluminium oxide.  
c. Name another metal oxide which behaves like aluminium oxide.
3. You are given a dry cell, a torch bulb with holder, wires and crocodile clips. How would you use them to distinguish between samples of metals and non-metals ? Explain the activity.
4. a. Name two physical properties each of sodium and carbon in which their behaviour is not as expected from their classification as metal and non-metal respectively.  
b. Metals are said to be shiny. Why do metals generally appear to be dull ? How can their brightness be restored ?  
c. Name two metals whose melting points are so low that they melt when held in the hand.
5. A zinc plate was kept in a glass container having CuSO<sub>4</sub>. On examining it was found that the blue colour of the solution is getting lighter and lighter. After few days, when the zinc plate was taken out of the

6. solution, a number of small holes were noticed in it. State the reason and give chemical equation of the reaction involved.
7. Explain the formation of a Sodium chloride molecule on the basis of electronic theory of valency.
8. State what are ionic compounds and their properties . Explain why ionic compounds have generally high melting points?
9. Write electron-dot structures for magnesium and oxygen. Show the formation of MgO by the transfer of electrons. What are the ions present in this compound ?
10. Draw the electron-dot structures of the following compounds and state the type of bonding in each case :  
(i) MgO (ii) CaO (iii) MgCl<sub>2</sub>
11. a. Explain why, a salt which does not conduct electricity in the solid state becomes a good conductor in molten state.  
b. Why are the metals like Na, K, Ca and Mg never found in their free state in nature ?
12. a. Why does aluminium not corrode right through ?  
b. What is a thermite reaction ? Explain with the help of an equation. State one use of this reaction.  
c.. What is meant by 'anodising' ? Why is it done ?
13. An element A which is a part of common salt and kept under kerosene reacts with another element B of atomic number 17 to give a product C. When an aqueous solution of product C is electrolysed then a compound D is formed and two gases are liberated.  
(a) What are A and B ?  
(b) Identify C and D.  
(c) What will be the action of C on litmus solution ? Why ?  
(d) State whether element B is a solid, liquid or gas at room temperature.  
(e) Write formula of the compound formed when element B reacts with an element E having atomic number 5.

**Class-X Science**  
**Chapter-4 : Carbon and its compounds**

**Objective Type Questions :**

**MCQs , Very Short Answer type**

1. Name the element whose one of the allotropic forms is buckminsterfullerene.
  - a. Carbon
  - b. Nitrogen
  - c. Hydrogen
  - d. Silicon
  
2. What are the property /properties of carbon which lead to the formation of a large number of carbon compounds ?
  - a. Catenation
  - b. Tetra-valency
  - c. Catenation and Tetravalency
  - d. None of the above
  
3. Name the element whose allotropic form is graphite.
  - a. Nitrogen
  - b. Carbon
  - c. Hydrogen
  - d. Oxygen
  
4. Which of the following molecule is called buckminsterfullerene ?
  - a. C<sub>90</sub>
  - b. C<sub>60</sub>
  - c. C<sub>70</sub>
  - d. C<sub>20</sub>

**Buckminsterfullerene is a spherical molecule in which 60 carbon atoms are arranged in interlocking hexagonal and pentagonal rings of carbon atoms.**

5. How many hexagons of carbon atoms are present in one molecule of buckminsterfullerene ?
  - a. 12
  - b. 15
  - c. 20
  - d. 60
  
6. How many pentagons of carbon atoms are present in one molecule of buckminsterfullerene ?
  - a. 12
  - b. 15
  - c. 20
  - d. 60
  
7. Name the black substance of pencil.
  - a. Graphite
  - b. Diamond
  - c. Lead
  - d. All the above
  
8. Ethene and ethyne are examples of
  - a. Saturated hydrocarbons
  - b. Unsaturated hydrocarbons
  - c. Both a and b
  - d. None of the above

9. Ethyne has carbon –carbon and carbon-hydrogen bonds
- Single and double bonds
  - Single and triple bonds
  - Double and single bonds
  - Triple and single bonds
10. The general formula  $C_nH_{2n}$  for cycloalkanes is the same as that of
- alkane
  - alkene
  - alkyne
  - All the above
11. What is the difference between two consecutive homologues in terms of molecular mass ?
- 14 u
  - 12 u
  - 10 u
  - 16 u
12. Will the current flow through the electrical circuit when we use the sharpened ends of the pencil to complete the circuit ? and why?
13. Write the structural formula of butane.
14. Name the form of carbon which is known as black lead .
15. Write the form of carbon which is used as a lubricant at high temperature .
16. What do you name the compounds of carbon with hydrogen alone ?
17. What do you call the hydrocarbons having the general formula of  $C_nH_{2n}$  .
18. What do you call the hydrocarbons having the general formula  $C_nH_{2n-2}$  ?
19. Which of the following is the molecular formula of benzene ?  
 $C_6H_6$  ,  $C_6H_{10}$  ,  $C_6H_{12}$  ,  $C_6H_{14}$
20. Which of the two has a branched chain : isobutane or normal butane ?
21. Which of the following compounds can have a double bond ?  
 $C_4H_{10}$  ;  $C_5H_8$  ;  $C_5H_{10}$
22. What is the next higher homologue of methanol ( $CH_3OH$ ) ?
23. Give the name and structural formula of one homologue of  $HCOOH$ .
24. What is the difference between two consecutive homologues in terms of number and kind of atoms per molecule.
25. Give the general name of the class of compounds having the general formula  $C_nH_{2n-2}$ .

## Short Answer Type

- Write the electron-dot structures for : (i) ethane, (ii) ethene, and (iii) ethyne.
- What is the atomic number of carbon. Write its electronic configuration.
  - What type of chemical bonds are formed by carbon ? Why ?
  - Name the three allotropic forms of carbon.
- What is the general name of all the compounds made up of carbon and hydrogen ?
  - Why does carbon form compounds mainly by covalent bonding ?
- What is meant by catenation ? Name two elements which exhibit the property of catenation.
  - Write the names and structural formulae of all the possible isomers of hexane.
- What is buckminsterfullerene ? How is it related to diamond and graphite ?
  - Why is diamond used for making cutting tools (like glass cutters) but graphite is not ?
  - Why is graphite used for making dry cell electrodes but diamond is not ?
- Give the general formula of an : (i) alkane (ii) alkene (iii) alkyne.
  - Classify the following compounds as alkanes, alkenes and alkynes :  
 $C_2H_4$ ,  $C_3H_4$ ,  $C_4H_8$ ,  $C_5H_{12}$ ,  $C_5H_8$ ,  $C_3H_8$ ,  $C_6H_6$
- Giving their structures, state the number of single bonds, double bonds and triple bonds (if any) in the following compounds :  
(i) ethyne      (ii) ethene      (iii) benzene
- Write the molecular formula and structure of cyclohexane. How many covalent bonds are there in a molecule of cyclohexane ?
- Explain the term 'isomers'. Give one example of isomers.
- What would be the electron dot structure of carbon dioxide which has the formula  $CO_2$  ?
- What will be the formula and electron dot structure of cyclopentane ?

## Long Answer type

- Write the answers -
  - What are hydrocarbons? Explain with examples.
  - Explain the meaning of saturated and unsaturated hydrocarbons with two examples each.
  - Give the names and structural formulae of one saturated cyclic hydrocarbon and one unsaturated cyclic hydrocarbon.
  - Give one example of a hydrocarbon, other than pentane, having more than three isomers.
  - How many isomers of the following hydrocarbons are possible ?  
(i)  $C_3H_8$  (ii)  $C_4H_{10}$  (iii)  $C_5H_{12}$  (iv)  $C_6H_{14}$

2. A solid element X has four electrons in the outermost shell of its atom. An allotrope Y of this element is used as a dry lubricant in machinery and also in making pencil leads.
- What is element X ?
  - Name the allotrope Y.
  - State whether allotrope Y is a good conductor or non-conductor of electricity.
  - Name one use of allotrope Y (other than lubrication and pencil leads)
  - Name two other allotropes of element X.
3. Two organic compounds A and B have the same molecular formula  $C_6H_{12}$ . Write the names and structural formulae :
- if A is a cyclic compound.
  - if B is an open chain compound.
  - Which compound contains single bonds as well as a double bond ?
  - Which compound contains only single bonds ?
4. The solid element A exhibits the property of catenation. It is also present in the form of a gas B in the air which is utilised by plants in photosynthesis. An allotrope C of this element is used in glass cutters.
- What is element A ?
  - What is the gas B ?
  - Name the allotrope C.
  - Name another allotrope of element A which exists as spherical molecules.
  - Name a yet another allotrope of element A which conducts electricity.
5. You are given the following molecular formulae of some hydrocarbons :  
 $C_5H_8$ ;  $C_7H_4$ ;  $C_6H_6$ ;  $C_5H_{10}$ ;  $C_7H_{12}$ ;  $C_6H_{12}$
- Which formula represents cyclohexane as well as hexene ?
  - Which formula represents benzene ?
  - Which three formulae represent open chain unsaturated hydrocarbons having double bonds ?
  - Which two formulae represent unsaturated hydrocarbons having triple bonds ?
  - Which three formulae can represent cyclic hydrocarbons ?
6. Write the answers-
- What is a homologous series ? Explain with an example.
  - State two characteristics of a homologous series.
  - The molecular formula of an organic compound is  $C_{18}H_{36}$ . Name its homologous series.
  - Select the hydrocarbons which belong to the same homologous series.  
 $CH_4$ ,  $C_2H_2$ ,  $C_2H_4$ ,  $C_2H_6$ ,  $C_4H_{10}$ ,  $C_3H_4$ ,  $C_3H_6$
  - What is meant by 'heteroatom'? Give examples. Write the names and formulae of two organic compounds containing different heteroatoms.
7. You are given an organic compound having the molecular formula  $C_3H_8$ . Give the name and formula of the compound formed :
- when one H atom of  $C_3H_8$  is replaced by a Cl atom.
  - when one H atom of  $C_3H_8$  is replaced by OH group.
  - when one H atom of  $C_3H_8$  is replaced by a CHO group.
  - when one H atom of  $C_3H_8$  is replaced by a COOH group.
  - when two H atoms joined to the middle carbon atom of  $C_3H_8$  are replaced by one O atom.