



ST. JOSEPH'S COLLEGE, PRAYAGRAJ

HALF YEARLY EXAMINATION 2024

CHEMISTRY

CLASS - IX

TIME: 2 Hours

MM: 80

Attempt all questions from Section A and four questions from Section B.
The intended marks for questions or parts of questions are given in brackets [].

SECTION A - [40 Marks]

(Answer all question from this section)

Q I) Choose the most appropriate answer for each of the following:

[15]

- Which of the following has water of crystallization?
(a) Potassium chloride (b) Sodium chloride
(c) Sodium nitrate (d) Washing soda crystal
- If the pressure is doubled for a fixed mass of a gas, its volume will become:
(a) 4 times (b) $\frac{1}{2}$ times
(c) 8 times (d) 2 times
- A colourless gas which turns lead acetate solution black is:
(a) SO_2 (b) H_2S
(c) CO_2 (d) NH_3
- The temperature of 0° Celsius on the kelvin scale is equals to:
(a) -273 K (b) 273 K
(c) -273°C (d) 100°C
- Element which forms divalent electropositive ion:
(a) magnesium (b) stannic
(c) chloride (d) sulphide
- The valency of an element is determined by its:
(a) atomic mass (b) atomic number
(c) symbol (d) formula
- Which of the gas is tested using Nessler's reagent:
(a) ammonia (b) hydrogen sulphide
(c) sulphur dioxide (d) Nitrogen dioxide
- The valency of cupric ion is:
(a) Cu^{+4} (b) Cu^{+1}
(c) Cu^{+3} (d) Cu^{+2}
- The symbol of potassium is:
(a) P (b) Po
(c) K (d) Pt
- Which metal can displace hydrogen from dilute acids:
(a) copper (b) mercury
(c) gold (d) sodium
- The valency of nitrogen in nitrogen dioxide NO_2 is:
(a) One (b) Two
(c) Three (d) Four
- _____ a green solid produced on heating orange coloured ammonium dichromate:
(a) Cr_3O_3 (b) $\text{K}_2\text{Cr}_2\text{O}_7$
(c) Cr_2O_3 (d) Cr_2O_4
- Assertion:** "When someone is stung by a bee, baking soda is rubbed on the spot, as baking soda is basic in nature".



Reason: The reaction between an acid and a base to form salt and hydrogen gas only is referred to as neutralisation.

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

14. The solubility of most _____ in water usually increases with rise in temperature.

- (a) Solids
- (b) liquids
- (c) Gas
- (d) both b and c

15. **Assertion:** Atoms are electrically neutral.

Reason: Atom contains equal number of electron and protons which balance the charges in the atom.

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

Q II)

1. **Fill in the blanks:**

[5]

- (a) One atom of chlorine combines with one hydrogen atom to form a molecule of _____ (chlorohydrogen/ Hydrogen chloride).
- (b) If the temperature is reduced to half _____ (pressure/ volume) would also reduce to half.
- (c) The molecular formula of aluminium oxide is _____ (AlO_3 / Al_2O_3).
- (d) The chlorine gas is _____. [Greenish yellow/ yellowish green].
- (e) Mixture of sodium chloride solution and silver nitrate solution gives _____ (white/ blue) precipitate of silver chloride.

2. **Define:**

[5]

- (a) Saturated solution
- (b) Absolute zero
- (c) Photochemical reaction
- (d) Water of crystallisation
- (e) Solubility

3. **Identify the term/gas/ substance in each of the following:**

[5]

- (a) A symbolic representation of a molecule of an element or of a compound.
- (b) A gas which turns starch iodide paper blue black.
- (c) A gas that fumes in moist air.
- (d) A reaction in which heat is evolved.
- (e) When two compounds exchange their ions to form two new compounds.

4. **Balance the following chemical reactions:**

[5]

- (a) $Al + HCl \longrightarrow AlCl_3 + H_2$
- (b) $MnO_2 + HCl \longrightarrow MnCl_2 + H_2O + Cl_2$
- (c) $HNO_3 \longrightarrow NO_2 + H_2O + O_2$
- (d) $NH_3 + Cl_2 \longrightarrow NH_4Cl + N_2$
- (e) $KI + NO_2 \longrightarrow KNO_3 + I_2 + NO$

5. **What do you observe when:**

[5]

- (a) Nitrogen dioxide gas is passed through acidified ferrous sulphate solution.
- (b) Carbon dioxide is passed through lime water first a little and then in excess
- (c) Blue vitriol is heated in a test tube.
- (d) A moist blue litmus paper is placed in a gas jar of chlorine.
- (e) HCl gas is passed through silver nitrate solution.



SECTION B – [40 Marks]

(Attempt any **four** questions from this section)

Q III)

1. A certain quantity of a gas measured 500ml at a temperature of 15^o C and 750mm Hg. What pressure is required to compress this quantity of gas into 400ml vessel at a temperature of 50^o C? [2]
2. Calculate the relative molecular mass of: [2]
 - a) Hydrated sodium sulphate
 - b) Blue vitriol[Given atomic mass: Na=23, S=32, O=16, H=1, Cu=63]
3. At 0^o C and 760mm Hg pressure, a gas occupies a volume of 100cm³. Kelvin temperature of the gas is increased by one-fifth and the pressure is increased one and a half times. Calculate the final volume of the gas. [3]
4. Deduce the chemical formula of the following compounds- [3]
 - a) Magnesium nitride
 - b) Sodium hypochlorite
 - c) Potassium bisulphate

Q IV)

1. Mr. Shiva has performed an experiment in a lab and concluded that both carbon dioxide and sulphur dioxide turns lime water milky. Explain how does he distinguished the two gases? [2]
 - a) Physically
 - b) Chemically
2. Give reason - [2]
 - a) Gases have great tendency to move.
 - b) Water is called as universal solvent.
3. Distinguish between the following- [3]
 - a) Drying and dehydrating agent.
 - b) Deliquescent and Hygroscopic substance.
 - c) Soft water and Hard water
4. The valency of metal 'M' is +3. Give the formula of its- [3]
 - a) Chloride
 - b) Sulphide
 - c) Hydroxide

Q V)

1. Write the chemical names of the following compounds a) Ca₃(PO₄)₂ b) Mg(HCO₃)₂ [2]
2. Classify the following as Combination, Displacement, Decomposition and Double decomposition reactions: [2]
 - a) $Zn + 2HCl \longrightarrow ZnCl_2 + H_2$
 - b) $4Na + O_2 \longrightarrow 2Na_2O$
3. a) State Charles law. [3]
- b) A gas occupies 22.4 liter at STP. Calculate the temperature at which it will occupy a volume of 10 liter at 2.46 atm?
4. a) What is the cause of permanent hardness of water? [3]
 - b) How can temporary hardness of water be removed by washing soda? (Write balanced chemical equations only.)



Q VI)

1. Identify the following: [2]
 - a) One twelfth the mass of an isotope of a carbon atom C-12.
 - b) The number of times one atom of the element is heavier than 1/12 times of the mass of an atom of C-12.
2. Write balanced chemical equation for each of the following: [2]
 - a) Reaction of iron (III) with chlorine.
 - b) Thermal decomposition of lead nitrate.
3. Draw a well labelled solubility curve for: NaCl, KNO₃ and CaSO₄ (hydrated). [3]
4. Define the following giving one example of each: [3]
 - a) Hydrated salt
 - b) Efflorescent substance

Q VII)

1. a) Why table salt is deliquescent in nature? [2]
b) What is the cause of temporary hardness of water?
2. State the valency of the element having: [2]
 - a) 6 electrons in the valence shell.
 - b) The electronic configuration of: 2, 3
3. Write the three disadvantages of hard water. [3]
4. A given mass of a gas occupies 572 cm³ at 13°C and 725 mm Hg pressure. What will be its volume at 24° C and 792 mm Hg pressure? [3]

Q VIII)

1. Write the basic and acidic radicals in the following compounds- [2]
 - a) CH₃COONa
 - b) NH₄NO₃.
2. Give reasons for the following: [2]
 - a) Mountaineers carry oxygen cylinders with them.
 - b) Boiled or distilled water tastes flat.
3. a) State 'Boyle's law' [3]
b) Write the mathematical expression of Boyle's law.
c) Give reason why inflating a balloon seems to violate Boyle's law.
4. Calculate the percentage of the following - [3]
 - a) Carbon in ethyne (C₂H₂).
 - b) Nitrogen in ammonia (NH₃).
 - c) Calcium in carbon carbonate (CaCO₃)[Given atomic weight: C=12, H=1, N=14, Ca=40, O=16].