



ST. JOSEPH'S COLLEGE, PRAYAGRAJ

HALF YEARLY EXAM – OCTOBER 2023

CHEMISTRY

Time: 2 Hrs.

Class IX

M.M.: 80

SECTION A

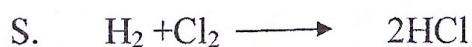
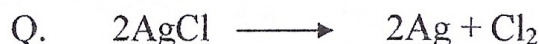
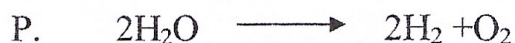
(Attempt all questions from this section)

Question 1

Choose one correct answer to the questions from the given options:

[15]

(i) Which of the following is thermal decomposition reaction?



(a) Only S

(b) Only Q

(c) Both P and Q

(d) Only R

(ii) What is the increase in volume when temperature of 600 mL of air increases from 27°C to 47°C under constant pressure?

(a) 640mL (b) 40mL (c) 650mL (d) 50mL

(iii) 173 K is equal to

(a) -200°C (b) 100°C (c) -100°C (d) 400°C

(iv) Ionic bond is formed between-

(a) Non metals only (b) Metal and non metal

(c) Metals only (d) Hydrogen and electronegative element

(v) In which of the following octate of atom is not complete?

P. H_2

Q. Cl_2

R. O_2

S. N_2

(a) Only P

(b) Only Q

(c) Both P and Q

(d) Only S

(vi) The number of valence electron(s) in O^{2-} is

(a) 6

(b) 4

(c) 10

(d) 8

- (vii) The formula of Iron (III) sulphate is-
- (a) Fe_3SO_4 (b) FeSO_4 (c) $\text{Fe}_2(\text{SO}_4)_3$ (d) $\text{Fe}(\text{SO}_4)_2$
- (viii) At constant temperature, if the pressure is doubled for a fixed mass of a gas, its volume will become-
- (a) 4 times (b) 2 times
(c) Half times (d) 8 times
- (ix) **Assertion:** "With the rise in temperature, the solubility of a gas in a liquid always decreases".
Reason: Solubility of KNO_3 increases with the rise in temperature.
- (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.
- (x) A gas which gives dense white fumes with ammonium hydroxide-
- (a) Hydrogen chloride gas
(b) Oxygen
(c) Ammonia
(d) Carbon dioxide
- (xi) The law which studies the relationship between pressure and volume at constant temperature-
- (a) Boyle's law
(b) Charle's law
(c) Gay-Lussac's law
(d) Avogadro's law
- (xii) The reaction in which heat is absorbed-
- (a) Neutralisation reaction
(b) Displacement reaction
(c) Exothermic reaction
(d) Endothermic reaction
- (xiii) Water turns anhydrous cobalt(II) chloride from- -
- (a) Blue to white
(b) Blue to red
(c) Pink to blue
(d) Blue to pink
- (xiv) The formula of potassium oxide is K_2O . What is the valency of Potassium?
- (a) +4
(b) +2
(c) +1
(d) -2

- (xv) Radha has performed an experiment to dissolve the sugar cubes in water. What ways she would have adopted to increase the solubility of sugar cubes in water?
- E. Lowered the temperature of water by adding ice
F. Stirred continuously
G. Increased the temperature of water
H. Crushed the sugar cubes into small particles

- (a) Only E
(b) Both E and F
(c) E, F and G
(d) F, G and H

Question 2

- (i) Complete the following by choosing the correct answer from the bracket [5]
- (a) S.I unit of temperature is _____ (Celsius/Kelvin).
(b) Inert gases have valency _____ (one / zero).
(c) The charged particles are called as _____ (ions/atoms).
(d) In ionic compound, the bond formed is due to _____ (transfer/sharing) of electrons.
(e) The molecular formula of calcium carbide is _____ ($\text{CaC}_4/\text{CaC}_2$)
- (ii) Identify the correct term/substance/gas for the following - [5]
- (a) The temperature at which all molecular motion ceases .
(b) A salt commonly called as caustic potash.
(c) $1/12$ the mass of carbon atom C-12
(d) A homogeneous mixture of a solute in a solvent.
(e) A gas with a rotten egg smell.
- (iii) There are some elements with atomic numbers 8,13,15,18 and 19.match them with each of the following- [5]
- (a) Element which can form divalent ion.
(b) Element with valency zero.
(c) Element with four shells.
(d) Element which doesn't form ions.
(e) Elements with 5 valence electrons.
- (iv) What do you observe when- [5]
- (a) Carbon dioxide is passed through lime water first in little and then in excess.
(b) Sulphur dioxide is passed through acidified $\text{K}_2\text{Cr}_2\text{O}_7$ solution.
(c) Hydrogen sulphide gas is passed through lead acetate solution.
(d) A piece of moist blue litmus paper is placed in gas jar of chlorine.
(e) Nitrogen dioxide is passed through acidified ferrous sulphate solution.

- (v) Balance the following equations- [5]
- (a) $\text{Mg}(\text{NO}_3)_2 \longrightarrow \text{MgO} + \text{NO}_2 + \text{O}_2$
(b) $\text{CaOCl}_2 + \text{NH}_3 \longrightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{N}_2$
(c) $\text{Zn} + \text{HNO}_3 \longrightarrow \text{Zn}(\text{NO}_3)_2 + \text{H}_2\text{O} + \text{NO}$
(d) $\text{HgO} \longrightarrow \text{Hg} + \text{O}_2$
(e) $\text{NH}_3 + \text{O}_2 \longrightarrow \text{NO} + \text{H}_2\text{O}$

SECTION B

(Attempt any four questions)

Question 3

- (i) Answer the following- [2]
 (a) Explain Bohr-Bury's scheme.
 (b) X is an element having atomic number 4, element Y has atomic number 17. What will be the formula of compound formed between X and Y? [2]
- (ii) Give the chemical names of the following salts- [2]
 (a) NaBr (b) Zn_3P_2 (c) CaC_2O_4 (d) $(NH_4)_2S$
- (iii) (a) Define Isotopes. [3]
 (b) In what respect do the isotopes of hydrogen differ? Give their structures. [3]
- (iv) (a) State Charle's law.
 (b) Give the mathematical expression of Charle's law.
 (c) 120cm^3 of a gas is taken at 27.3K . The temperature is then raised to 0°C . What is the new volume of the gas? The Pressure is kept constant.

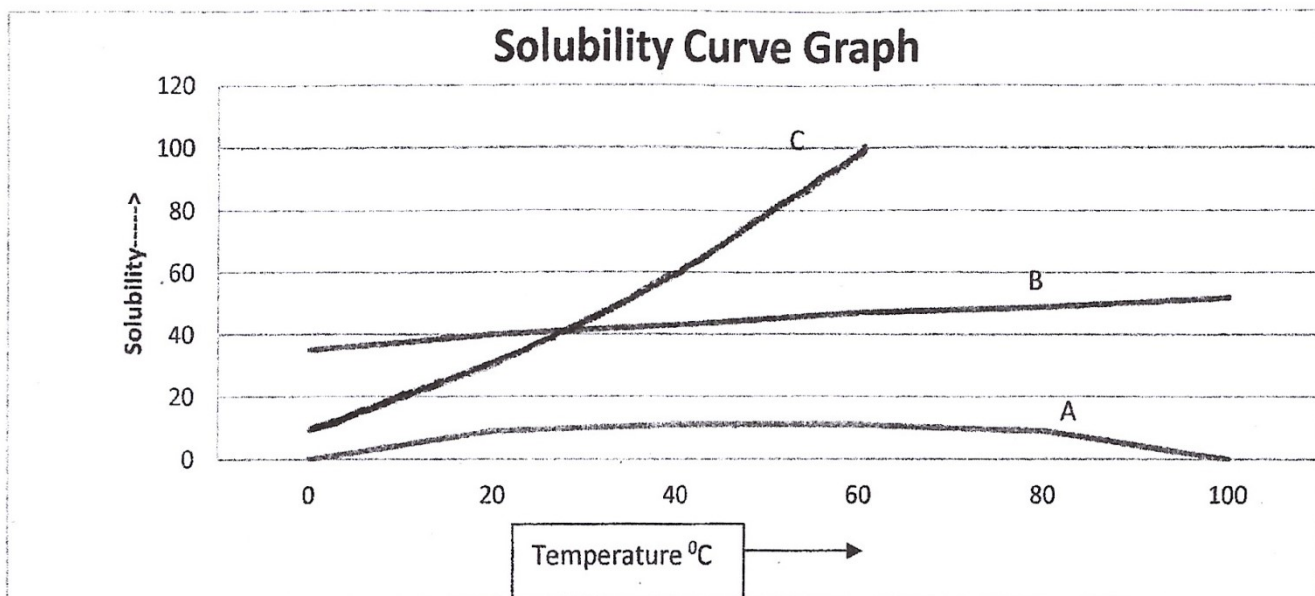
Question 4

- (a) Calculate the relative molecular masses of [2]
 [$C=12$, $H=1$, $O=16$, $Ca=40$, $Cl=35.5$]
 i. Hydrated calcium chloride ($CaCl_2 \cdot 6H_2O$)
 ii. Glucose ($C_6H_{12}O_6$)
- (b) Deduce the molecular formula for the following compounds- [2]
 i. Ammonium Carbonate
 ii. Ferric Chlorate
 iii. Lead (IV) Oxide
 iv. Sodium bisulphite
- (c) 2500cm^3 of hydrogen is taken at STP. The pressure of this gas is further increased by two and a half times (temperature remaining constant). What volume will hydrogen occupy now? [3]
- (d) The formula of the chloride of a metal 'M' is MCl_2 . State the formula of its [3]
 i. Carbonate ii. Hydroxide iii. Nitrate

Question 5

- (a) Calculate the percentage of oxygen in ammonium nitrate. [2]
 [RAM is $H=1$, $N=14$, $O=16$]
- (b) Draw the orbital diagram of Al^{3+} ion and state the number of three fundamental particles present in it (atomic mass of $Al=27$). [2]
- (c) Give reason- [3]
 i. Water is called as universal solvent.
 ii. Inflating a balloon seems to violate Boyle's law.
 iii. Distilled water tastes flat.

- (d) Predict the name of solids given as A,B and C showing the variation in solubility with changing temperature in the following solubility curve graph- [3]



Question 6

- (a) Differentiate between the following- [2]
 i. Deliquescent substance and hygroscopic substance
 ii. Soft water and hard water
- (b) 20dm³ of oxygen is contained in a vessel at a pressure of 200 atmosphere. [2]
 If another empty vessel of similar capacity is connected to it, calculate the common pressure of a gas in both the vessel.
- (c) Draw the orbital diagram of the following- [3]
 i. Magnesium chloride
 ii. Methane
 iii. Nitrogen molecule
- (d) At 0°C and 760mm Hg pressure, a gas occupies a volume of 100cm³. [3]
 The 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.

Question 7

- (a) Define the following - [2]
 i. Water of crystallization
 ii. Relative atomic mass
- (b) Give reason- [2]
 i. It is necessary to specify the pressure and temperature of a gas while stating its volume.
 ii. Mountaineers carry oxygen cylinders with them.
- (c) A cylinder of 20 litres capacity contains a gas at 100 atmospheric pressure. [3]
 How many flasks of 200cm³ capacity can be filled from it at 1 atmosphere pressure, temperature remaining constant?

- (d) i. Differentiate between the temporary and permanent hardness of water. [3]
 ii. How can the temporary hardness be removed. (Support your answer by giving equations).

Question 8

- (a) Define - [2]
 i. Dehydrating agent ii. Saturated solution
- (b) Answer the following- [2]
 i. How many bonds are present between two oxygen atoms in one molecule of oxygen gas?
 ii. What are the maximum number of electrons that can be accommodated in?
 A. M-shell B. N-shell
- (c) Calculate the final volume of a gas 'X', if the original pressure of the gas, at STP is doubled and its temperature is increased three times. [3]
- (d) What happens when- [3]
 (a) A piece of magnesium ribbon is placed in copper sulphate solution.
 (b) A piece of copper metal is placed in an iron sulphate solution.
 (c) H_2S is passed through aqueous copper sulphate solution.

*****ALL THE BEST*****