

SECTION – I

2. Write short answers to any EIGHT (8) questions :

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- (i) 23 g of sodium and 238 g of uranium have equal number of atoms in them. Justify.
- (ii) Why actual yield is always less than theoretical yield?
- (iii) Define the term atomicity. Give example.
- (iv) Describe Gooch Crucible.
- (v) How the fluted filter paper is prepared?
- (vi) How the crystals are dried in crystallization?
- (vii) Why pilots feel uncomfortable breathing in un-pressurized cabins?
- (viii) Derive Charles's law from kinetic molecular theory.
- (ix) Some of postulates of kinetic molecular theory are faulty. Justify.
- (x) Discuss effect of change in temperature on K_w .
- (xi) Justify that chemical equilibrium is dynamic in nature.
- (xii) Discuss effect of common ion on solubility.

3. Write short answers to any EIGHT (8) questions :

16

- (i) Though oxygen and sulphur belong to same group but water is liquid while H_2S is a gas at room temperature. Why?
- (ii) Write four uses of liquid crystals.
- (iii) Define crystal lattice with an example.
- (iv) Heat of sublimation of iodine is very high. Why?
- (v) Define Hund's rule and Pauli's exclusion principle.
- (vi) Calculate mass of electron using its e/m value.
- (vii) What is origin of X-rays?
- (viii) State $(n + \ell)$ rule.
- (ix) Define the term molarity and molality.
- (x) What do you mean by water of crystallization? Give an example.
- (xi) Differentiate between average and instantaneous rates of reaction.
- (xii) Define zero order reaction. Give an example.

4. Write short answers to any SIX (6) questions :

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- (i) Why $\sigma 2p_x$ is higher in energy in B_2 , C_2 and N_2 and lower in energy in O_2 and F_2 in energy level diagram?
- (ii) Draw shape and write bond angle in NH_3 and BF_3 molecules with respect to VSEPR theory.

(Turn Over)

4. (iii) Define electron affinity. Name two factors affecting electron affinity.
- (iv) Why lone pair of electron occupy more space than bond pair of electron?
- (v) Define state of system and state function.
- (vi) Define enthalpy of reaction. Give one example.
- (vii) Define spontaneous process. Give one example.
- (viii) How impure copper can be purified.
- (ix) What is standard hydrogen electrode?

SECTION – II

Note : Attempt any **THREE** questions.

5. (a) Write all the steps involved in determination of empirical formula. 4
- (b) Define evaporation. On what factors it depends? Discuss. 1,1,2
6. (a) 250 cm^3 of hydrogen is cooled from 127°C to -27°C by maintaining the pressure constant. Calculate the new volume of the gas at this low temperature. 4
- (b) What is the concept of dual nature of matter? Also derive de-Broglie's equation. 4
7. (a) What is dipole moment? Give its various units. Find relationship between Debye and mc . 4
- (b) Calculate the pH of a buffer solution in which 0.11 molar CH_3COONa and 0.09 molar acetic acid solution are present K_a for acetic acid (CH_3COOH) is 1.85×10^{-5} . 4
8. (a) State and explain Hess's law of constant heat summation with an example. 4
- (b) Describe the construction and working of standard hydrogen electrode. 4
9. (a) Discuss two types of solutions of liquids in liquids. 4
- (b) Define the following with examples : 4
 - (i) Autocatalysis. (ii) Negative catalysis. (iii) Homogeneous catalysis.
 - (iv) Enzyme catalysis.

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