

SECTION – I

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

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- (i) N_2 and CO have the same number of electrons, protons and neutrons, justify.
- (ii) Law of conservation of mass have to be obeyed during stoichiometric calculations, explain.
- (iii) Why actual yield is always less than theoretical yield?
- (iv) Write down any two uses of chromatography.
- (v) In solvent extraction technique, why repeated extractions using small portions of solvent are more efficient than using a single extraction but larger volume of solvent?
- (vi) How undesirable colours in crystallization process can be removed?
- (vii) Write formulas to interconvert various scales of temperature.
- (viii) How density of an ideal gas can be calculated from ideal gas equation?
- (ix) Derive Charles's law by kinetic equation of gases.
- (x) What is Henderson equation and for which purpose it is used?
- (xi) What are applications of buffer in daily life?
- (xii) Derive ionic product of water and what is its value at $25^\circ C$?

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

16

- (i) Define anisotropy, with example.
- (ii) What is symmetry of a crystal?
- (iii) Define isomorphism with example.
- (iv) Define unit cell, give its crystallographic elements.
- (v) What is Moseley's law?
- (vi) Define Hund's rule.
- (vii) Discuss briefly principal quantum number.
- (viii) What is Aufbau's principle?
- (ix) What are discontinuous solubility curves?
- (x) Define colligative properties , give two examples.
- (xi) What is meant by homogeneous catalysis, give one example.
- (xii) How surface area of reactants affect rate of reaction?

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

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- (i) π bonds are more diffused than σ bonds. Why?
- (ii) What is bond order? Give an example.

4. (iii) Define covalent bond. Draw the Lewis structure of water.
- (iv) The radius of an atom can not be determined precisely. Why?
- (v) What is enthalpy of combustion? Give an example.
- (vi) Define system and surrounding.
- (vii) What are exothermic reactions? Give an example with equation.
- (viii) Calculate the oxidation number (O.N) of "Mn" in $KMnO_4$.
- (ix) Write two functions of salt bridge.

SECTION – II

Note : Attempt any **THREE** questions.

5. (a) Explain construction and working of mass spectrometer. 4
- (b) Give properties of neutron in detail (any four). 4
6. (a) Calculate the mass of 1 dm^3 of NH_3 gas at 30°C and 1000 mm Hg . 1,2,1
- (b) How electrochemical series is helpful in the prediction of feasibility of chemical reaction and relative chemical reactivity of metals? 2,2
7. (a) Explain sp^3 hybridization by taking example of methane (CH_4). 4
- (b) Explain bomb calorimetric method for the measurement of enthalpy of reaction. Also draw diagram. 3,1
8. (a) What are molecular solids? Give their important characteristics. 4
- (b) The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at 25°C . Calculate the solubility of the compound. 4
9. (a) State solubility curves and explain continuous and discontinuous solubility curves. 1, $1\frac{1}{2}$, $1\frac{1}{2}$
- (b) What are the characteristics of a catalyst. (Any four)? 1,1,1,1

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