Roll No._____ to be filled in by the candidate

(For All Sessions)

Group - II

Chemistry (Essay Type)

Time: 2:40 Hours

Section- I

Marks:68

2- Write short answers of any eight parts from the following. 2 x 8 = 16

i. Write the formulas to determine the percentage of carbon and hydrogen in combustion analysis.

ii. How the molecular and empirical formulas are related to each other?

iii. Define gram molecule by giving two examples.

iv. Define sublimation and give examples.

v. Differentiate between adsorption and partition chromatography.

vi. Define qualitative and quantitative analysis.

vii. Define Avogadro's Law and give two examples.

viii. One dm^3 of H_2 and O_2 have different masses but occupy same volumes. Give reason

ix. Why the sum of mole fractions is always equal to unity?

x. Define law of mass action and give the equilibrium constant expression.

xi. Write the formula to calculate the percentage ionization of weak acids.

xii. Define Lowry Bronsted acid base concept.

3- Write short answers of any eight parts from the following. 2 x 8 = 16

i. In a very cold winter fish in the garden ponds owe their lives due to H-bonding. Justify.

ii. Water and ethanol can mix easily and in all proportions. Justify.

iii. Cleavage of the crystals is itself anisotropic behaviour. Justify.

iv. London dispersion forces are weaker than dipole – dipole forces. Why?

v. Differentiate between frequency and wave number.

vi. Write two importance of Mosely's law.

vii. What is Zeeman effect?

viii. Write down any two postulates of plank's quantum theory.

ix. Differentiate between Molarity and Molality.

x. What is fractional crystalization?

xi. The radio active decay is always first order reaction. Give reason.

xii. Differentiate between homogeneous and Heterogeneous catalysis.

4- Write short answers of any six parts from the following. 2 x 6 = 12

i. Name the factors influencing the electron affinity.

ii. Define orbital hybridization and name its types.

iii. Explain bond order for Helium and why it does not exist as He_2 molecule?

iv. Ionization energy decreases down the group. Why?

v. Define internal energy and point out; is it a state function or not?

vi. What do you mean by heat of solution; give a suitable example.

vii. Define state function, write names of two such functions.

viii. What do you mean by Standard Hydrogen Electrode (SHE).

ix. Impure Cu can be purified by electrolytic process, justify?

Section– II

8 x 3 = 24

NOTE : Answer any three questions from the following.

5.(a) What is limiting reactant, give examples and how it is identified.

(b) Explain measurement of e/m value of electron. 04+04

6.(a) Describe the charging and discharging of Lead Accumulator.

(b) Calculate the mass of 1 dm^3 of NH_3 gas at 30°C and 1000mmHg pressure, considering that NH_3 is behaving ideally. 04+04

7.(a) Discuss Geometry of ethene $\left(C_2H_4\right)$ according to Sp^2 hybridization.

(b) How can you measure enthalpy of reaction by glass calorimeter. 04+04

8.(a) What is hydrogen bonding. Give its three applications.

(b) The solubility of CaF_2 in water at 25°C is found to be 2.05×10^{-4} mol dm^{-3}. What is value of Ksp at this temperature? 04+04

9.(a) Explain graphically depression of freezing point of a solvent by solute. Also write down its mathematical form.

(b) Clearly differentiate between Homogeneous and Heterogeneous catalysis. Give two examples of each. 04+04