2021

Time : 3 Hours

Maximum Marks : 75

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer **Five** questions, selecting at least **one** from each Group, in which Q. No. 1 is compulsory.

D-805

1. Explain any three of the following : 5×3=15

(a) Analytical test of fluoride ion.

(b) Dipole moment of NH_3 is greater than NF_3.

(c) Free energy is extensive property while chemical potential is an intensive property.

(d) Under what condition $\Delta H = \Delta E$ for a chemical reaction.

(e) Work done is isothermal and reversible process is maximum.

Group - A

(a) State and explain Second law of thermodynamics. $7\frac{1}{2}$

(b) Deduce Ceibbs. Helmholtz equation. $7\frac{1}{2}$

3. Explain any three of the following : 5×3=15

(a) Internal energy and Enthalpy

(b) Molar heat capacities C_P & C_v

(c) Kirchhoff's Law

(d) Adiabatic process

4. (a) Explain reduced phase rule equation. $7\frac{1}{2}$

(b) Draw and explain the phase diagram of KI – H_2O. $7\frac{1}{2}$

5. Write notes on any three of the following : 5×3=15

(a) Carnot's theorem

(b) Triple point

(c) Clausis – clapeyron equation

(d) Frist law of thermodynamics

Group - B

6. Explain molecular orbital theory and from molecular orbital diagram draw the structure of N_2, N_2^+ and N_2^- 15

7. Discuss the chemistry of Mn or Ni with respect to the following : 15

(i) Oxidation state

(ii) Ore and Extraction

(iii) Colour of the compound

(iv) Analytical test

(v) Uses

8. (a) Discuss Valence Bond theory of Co-ordination compounds with two examples. 10

(b) Ni $(Co)_4$ is tetrahedral and diamagnetic. 5

9. Explain different types of Isomerism shown by co-ordination compound. 15

10. Write notes on any two of the following : $7\frac{1}{2}$×2=15

(i) Oxy acids of Sulphur

(ii) Properties of Fluorine

(iii) Werner theory of Co-ordination compounds.

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