(i) Printed Pages : 4

(ii) Questions : 9

Roll No. .....

Sub. Code : 0151

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B.A./B.Sc. (General) 2nd Semester

1046

CHEMISTRY (Same for B.Sc. Microbial and Food Tech.)

Paper–VII : Physical Chemistry-B

Time Allowed : Three Hours] [Maximum Marks : 22

Note : Attempt **five** questions in all, including Question No. **IX** which is compulsory and selecting **one** question from Units I, II, III and IV. You may use simple calculators.

UNIT–I

I. (a) What are Extensive and Intensive Properties ? Explain. 1

(b) What are molar heat capacities at constant volume and constant pressure ? How are they related ? 1

(c) Derive expression for w, q, Δ E and Δ H for an ideal gas undergoing isothermal reversible expansion. 2

II. (a) Define Joule Thomson Coefficient and Inversion Temperature. What is the significance of Inversion Temperature in adiabatic expansion of real gas ? 1

(b) Describe comparison between Reversible Isothermal and Adiabatic expansion for an ideal gas. Show with graph if any. 1

(c) Derive :

(i) $PV_r = \text{Constant}$

(ii) $TV_{r-1} = \text{Constant}$. 2

UNIT–II

III. (a) Derive the relationship :

$$\frac{\Delta U_2 - \Delta U_1}{T_2 - T_1} = \Delta C^v$$

Also name the equation. 1

(b) State Hess's Law of Constant Heat Summation. 1

(c) Enthalpy of Neutralisation of all strong acids and strong bases is equal. Explain. 1

(d) Define bond energy and bond dissociation energy. 1

IV. (a) Define :

(i) Enthalpy of hydration

(ii) Enthalpy of solution. 2

(b) The heat of reaction for the formation of Ammonia by Haber's Process at 300 K was found to be –91.95 kJ. What will be the heat of formation at 323 K. The molar heat capacities at 300 K for N_2, H_2 and NH_3 are 28.45, 28.33 and 37.07 J mol^{-1} K^{-1} respectively. 2

UNIT–III

V. (a) Give different methods for formation of emulsions. 1

(b) Explain five important applications of colloids. 1

(c) Define :

(i) Imbibition

(ii) Peptization. 2

VI. (a) How colloidal solution can be purified ? 2

(b) What is the cause of Tyndall effect ? 1

(c) Why some Colloidal solutions are coloured ? 1

UNIT–IV

VII. (a) What are Colligative Properties ? How can you explain the fact that elevation of Point is a Colligative Property. 2

(b) What do you know about abnormal molecular masses ? Explain. 1

(c) What are ideal and non ideal solutions ? 1

VIII. (a) Thermodynamically derive the relationship between elevation in Boiling Point and relative lowering of Vapour Pressure. 1

(b) A 10% solution of an organic compound (with Mol. Wt 92) is given. Taking R = 0.0821 litre. atm / degree / mol. Calculate osmotic pressure at 10° C. 2

(c) Explain in detail about azeotropes. 1

(Compulsory)

IX. (a) Under what conditions is Van't Hoff factor 'i' not equal to one ?

(b) Define Electrophoresis.

(c) What is Standard State ?

(d) Define enthalpy of formation.

(e) Define Gold Number.

(f) Define the term 'Chemical Potential.' $6 \times 1 = 6$