21718

3 Hours / 100 Marks   Seat No.

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any SIX of the following:**   **12**

   (i)   Define intensive and extensive properties with examples.

   (ii) Define degree of freedom.

   (iii) State Zeroth law of thermodynamics.

   (iv) Define colloidal solution.

   (v)   Name three elements used for alloying aluminium.

   (vi) What is caustic embrittlement?

   (vii) Define wet corrosion.

   b) **Attempt any TWO of the following:**   **8**

   (i)   State properties of Teflon and PVC.

   (ii) Compare hydrophillic and hydrophobic collids.

   (iii) Explain any one corrosion protection method.

Marks

2. **Attempt any FOUR of the following:** **16**

   a) Derive equation for work done in isothermal expansion of ideal gas.

   b) Give any four properties of mild steel.

   c) Derive Langmuir adsorption isotherm.

   d) Explain the term electrode potential with example.

   e) Explain with diagram water system.

   f) Explain mechanism of dry corrosion.

3. **Attempt any FOUR of the following:** **16**

   a) Explain in brief lead lining and state its purpose.

   b) Suggest suitable material of construction for storage of

     (i) Ethanol

     (ii) Concentrated Sulphuric Acid

     (iii) Toulene

     (iv) Concentrated Nitric Acid

   c) Give any four applications of adsorption and explain in detail.

   d) Draw and explain phase diagram of Sulphur System.

   e) Define and derive expression of enthalpy.

   f) State first and second law of thermodynamics.

4. **Attempt any FOUR of the following:** **16**

   a) 2 mole of an ideal gas is heated from $90°$ k to $320°$ k. Calculate ΔS if.

     (i) The volume is kept constant.

     (ii) The pressure is kept constant assume that $C_v = 1.5$ R.

   b) Explain with sketch, working of galvanic cell.

   c) Explain electroplating with neat sketch.

   d) State phase rule and give its formula.

   e) Compare Lyophillic and Lyophobic colliodal solutions.

   f) Give any four characteristics of corrosion protective coating of an ideal gas.

Marks

5.   **Attempt any FOUR of the following:**   **16**

a) Explain effect of temperature and pH on corrosion.

b) Determine degree of freedom for the following.

   (i)   ICE $\rightleftharpoons$ Water $\rightleftharpoons$ Vapour
            (*s*)   (*l*)   (*g*)

c) Explain mechanism of Adsorption.

d) What are the importance of lining? Write different types of lining.

e) Explain with examples Homogenous and Heterogenous system.

f) State types of adsorption and explain them in detail.

6.   **Attempt any FOUR of the following:**   **16**

a) Explain pitting and uniform corrosion.

b) What are the factors affecting rate of corrosion?

c) Define Isobaric, Isochoric, Isothermal process.

d) Explain method for preparation of Lyophobic solution.

e) Give the mathematical statement of Gibb's phase rule and explain the term involved in it.

f) State the importance of lining in chemical industry with example.

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