17423

11920

3 Hours / 100 Marks Seat No. | | | | | | | | |

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

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

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) 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 degree of freedom

(ii) Define second law of thermodynamics.

(iii) Define corrosion.

(iv) Give two properties of polyethylene.

(v) Define Adsorbent and Adsorbate.

(vi) Define passivity of metal.

(vii) Name the elements of aluminium alloy.

Marks

b) **Attempt any <u>TWO</u> of the following:** **8**

(i) Define Heterogeneous System and Homogeneous System, give examples. Explain it.

(ii) Define colloidal solution. Explain dispersion method for preparation of it.

(iii) Explain Hydrogen evolution mechanism of wet corrosion.

2. Attempt any <u>FOUR</u> of the following: **16**

a) Write any four industrial application of SS-316.

b) Explain the rubber lining process.

c) Explain method of glass lining on Iron.

d) Explain electroplating process for prevention of corrosion.

e) Explain effect of P_H value on corrosion.

f) Write suitable material of for storage of

(i) HCl acid

(ii) CH_3COOH acid

(iii) Caustic Iye

(iv) Conc. H_2SO_4

3. Attempt any <u>FOUR</u> of following: **16**

a) Calculate Q, W, ΔU, ΔH for isothermal expansion of 1 mol of an ideal gas at 27°C from a volume of volume of 10 m^3 to 20 m^3, against a constant external pressure of 1 atm.

b) Explain Freundlich adsorption isotherm.

c) Explain galvanic cell with neat diagram.

d) Define entropy, internal energy and its mathematical equation.

e) Give the importance of lining.

f) Give enthalpy equation and define it, define its terms.

Marks

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

a) Calculate W and Q for 1 mole of an ideal gas which expands from V_1 to 10 V_1 at 300°K isothermally under reversible condition.

b) Differentiate between Lyophilic Lyophobic sols based on

(i) Defination

(ii) Nature of substance

(iii) Viscosity

(iv) Stability

c) Write any four features of electrochemical series.

d) Draw phase diagram of sulfur system.

e) State first, third, and zeroth law of thermodynamics and give its mathematical equation.

f) Explain any four application of adsorption.

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

a) Differentiate between dry and wet corrosion.

b) Explain bridge arc method for preparation of Lyophobic solution.

c) Define system and surrounding, what do you mean by isolated system, give example.

d) 1 mol of an ideal gas is heated from 100°k to 300°k.

Calculate ΔS. if

(i) Volume is kept constant

(ii) Pressure is kept constant assume $C_v = 1.5\ R$

e) Differentiate between reversible and irreversible process.

f) Give any four properties of Teflon.

Marks

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

a) Name the two situations each where galvanic and uniform corrosion occurs.

b) Define triple point of water. Give its conditions on phase diagram.

c) Explain how wide film plays important role in atmospheric corrosion.

d) Differentiate between physical adsorption and chemical adsorption.

e) Determine degree of freedom

(i) Liquid ammonia in equilibrium with its vapours

(ii) Aqueous solution of NaOH

f) Explain lead lining and its purpose.