

17423

15116

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) 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) Differentiate between intensive and extensive properties with example.
- (ii) Define colloidal solution.
- (iii) Enlist the types of corrosion.
- (iv) State phase rule.
- (v) State first law of thermodynamics.
- (vi) What are the uses of cast iron?
- (vii) How temperature effect on corrosion?

P.T.O.

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

- (i) Differentiate between Lyophilic and Lyophobic colloidal solution.
- (ii) Explain use of inhibitors in corrosion protection.
- (iii) Enlist properties of materials consider during the selection for construction.

2. Attempt any FOUR of the following: 16

- a) Derive expression of enthalpy for isothermal expansion of gases.
- b) Explain mechanism of wet corrosion.
- c) Determine the degree of freedom for following system:
 - (i) Liquid water
 - (ii) Liquid water and Ice
- d) Explain any one method for preparation of colloidal solution.
- e) Discuss the classification of engineering materials.
- f) Explain in brief Galvanic cell.

3. Attempt any FOUR of the following: 16

- a) Differentiate between reversible and irreversible process.
- b) Differentiate between physical and chemical adsorption.
- c) Explain in brief glass lining and state its purpose.
- d) Calculate Q, W, ΔU and ΔH for the Isothermal expansion of 1 mol. of an ideal gas at 27°C from a volume of 10 m^3 to 20 m^3 against a constant external pressure of 1 atm.
- e) Draw neat labelled diagram for water system.
- f) Write any two industrial applications of each:
 - (i) PVC
 - (ii) Teflon

4. Attempt any FOUR of the following: 16

- a) Define:
 - (i) Phase
 - (ii) Component
 - (iii) Degree of freedom
- b) Give any four characteristics of corrosion protective coatings.
- c) State second law of thermodynamics and give its derivation.
- d) Explain Freundlich adsorption isotherm.
- e) Describe pitting corrosion.
- f) Write names of materials of construction for storage of:
 - (i) H_2SO_4 acid
 - (ii) CH_3COOH
 - (iii) $\text{C}_2\text{H}_5\text{OH}$
 - (iv) Caustic Soda

5. Attempt any FOUR of the following: 16

- a) Explain any four applications of adsorption.
- b) Write note on caustic embrittlement.
- c) Differentiate between:
 - (i) Open and closed system.
 - (ii) Isobaric and Isochoric process.
- d) Give any four properties of carbon steel.
- e) 1 mol of an ideal gas is heated from 100 k to 300 k. Calculate ΔS if:
 - (i) The volume is kept constant.
 - (ii) The pressure is kept constant.
- f) Derive Langmuir adsorption isotherm.

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

- a) Explain prevention of corrosion based on special heat treatment.
 - b) Explain any one method for preparation of Lyophobic sols.
 - c) Define:
 - (i) Isothermal process
 - (ii) Adiabatic process
 - (iii) Cyclic process
 - (iv) Internal energy
 - d) State third and zeroth law of thermodynamics and also give their mathematical expression.
 - e) What are the importances of plastic lining?
 - f) Name the two situations each where:
 - (i) Uniform corrosion and
 - (ii) Oxidation corrosion occurs
-