

# 17423

**15162**

**3 Hours / 100 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.  
(2) Illustrate your answers with neat sketches wherever necessary.  
(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.
  - (ii) What do you mean by oxidation corrosion ?
  - (iii) Define –
    - (1) Adsorbent
    - (2) Adsorbate
  - (iv) Define colloids. Write any two characteristics of colloids.
  - (v) Define –
    - (1) Phase
    - (2) Component
  - (vi) Give the composition of duralumin.
  - (vii) Define passivity of metal.

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- b) **Attempt any TWO of the following:** **8**
- (i) Explain pitting and galvanic corrosion.
  - (ii) Explain homogenous and heterogenous systems with suitable examples.
  - (iii) Explain hydrogen evolution mechanism of wet corrosion.
- 2. Attempt any FOUR of the following:** **16**
- a) State and explain Gibb's phase rule.
  - b) Explain the rubber lining process.
  - c) Write any four industrial applications of SS-316.
  - d) Explain the work done in reversible isothermal expansion of gas.
  - e) Explain, freundlich adsorption isotherm.
  - f) Explain galvanic cell in brief.
- 3. Attempt any FOUR of the following:** **16**
- a) Differentiate between Reversible and Irreversible process (Any four points)
  - b) Explain Bredig's arc method for preparation of hydrophobic sols.
  - c) Explain caustic embrittlement in brief.
  - d) Write any four purposes of lining.
  - e) Derive the expression for Langmuir adsorption isotherm.
  - f) Write a suitable material of construction for storage of
    - (i) HCl acid
    - (ii) CH<sub>3</sub>COOH acid
    - (iii) Caustic lye
    - (iv) conc. H<sub>2</sub>SO<sub>4</sub>

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

- a) Differentiate between Lyophilic and Lyophobic sols based on
  - (i) Definition
  - (ii) Nature of substance
  - (iii) Viscosity
  - (iv) Stability
- b) State, first, second, third and zeroth law of thermodynamics.
- c) Explain electroplating process for prevention of corrosion.
- d) Give the composition of SS-304. Write its three properties.
- e) Define –
  - (i) Enthalpy
  - (ii) Entropy
  - (iii) Internal energy
  - (iv) Chemical potential
- f) Differentiate between physical and chemical adsorption.

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

- a) Define:-
  - (i) Isothermal process
  - (ii) Isobaric process
  - (iii) Adiabatic process
  - (iv) Isochoric process
- b) Draw the phase diagram of sulphur system.
- c) Write any four features of electro-chemical series.
- d) Write any four properties of Teflon.
- e) Explain any four application of adsorption.
- f) Differentiate between dry and wet corrosion. (Any four points)

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

- a) Give classification of engineering materials with suitable example.
  - b) Explain the use of inhibitors for prevention of corrosion.
  - c) Explain adiabatic expansion of gas.
  - d) Determine the degree of freedom for the following system.
    - (i)  $\text{NH}_3$  gas is dissolved in water.
    - (ii)  $\text{NaCl}$  is dissolved in water.
  - e) 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 conditions.
  - f) Explain method of glass lining on Iron.
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