17423

21819

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

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) 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 the terms: System and Surroundings.

(ii) Define Colloids. Write any two characteristics of colloids.

(iii) Define Corrosion. Give one example.

(iv) State the Gibbs phase rule.

(v) State second law of thermodynamics.

(vi) Give the composition of Duralumin.

(vii) What is the effect of temperature on corrosion?

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

(i) Describe Bredig's arc method for preparation of colloidal solution.

(ii) Explain caustic embrittlement.

(iii) Give classification of engineering materials with examples.

Marks

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

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

b) Explain electrochemical series in brief.

c) Draw neat labelled phase diagram of sulphur system.

d) Distinguish between lyophilic and lyophobic colloids.

e) Write any four industrial application of SS 304.

f) Explain the mechanism of dry corrosion.

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

a) Distinguish between reversible and irreversible process.

b) Derive the expression for Langmuir adsorption isotherm.

c) Explain lead lining in brief.

d) Calculate the work done in Rj by an ideal gas when 1 mol of the gas is expanded reversibly and isothermally from 5atm to latm at 298k

e) Explain the phase diagram for the water system.

f) State two industrial applications of Teflon and polypropylene as material of construction.

Marks

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

a) Determine degree of freedom for the following

(i) System of pure gas.

(ii) System of water in equilibrium with its vapour.

b) Define corrosion inhibitors. List any four corrosion inhibitors

c) State zeroth and third law of thermodynamics.

d) Explain galvanic corrosion.

e) Distinguish between physical and chemical adsorption.

f) Write a suitable material of construction for storage of

(i) Fuming nitric acid

(ii) Caustic lye.

(iii) Sodium chloride

(iv) Naphtha

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

a) Give any four applications of adsorption, and explain any two.

b) Explain sacrificial anodic method of corrosion prevention.

c) Define:

(i) Enthalpy

(ii) Entropy

(iii) Internal energy

(iv) Cyclic process

d) Give any four properties and four uses of mild steel.

e) Explain Freundlich adsorption isotherm.

f) Calculate the pressure-volume work done in joules by a system containing a gas when it expands from 1 l to 2 l against a constant pressure of 10 atm.

Marks

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

a) Explain the process of electroplating with neat diagram.

b) Explain aggregation method for preparation of colloidal solution (any two).

c) Define:

(i) Isothermal process

(ii) Adiabatic process

(iii) Isobaric process

(ii) Isochoric process

d) Explain adiabatic expansion of a gas.

e) Name the methods for lining glass on iron. Explain them in brief.

f) Explain passivity of metals.