17423

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) Assume suitable data, if necessary.

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

(7) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

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

(i) Define isobaric and isochoric process.

(ii) Define Lyophobic and Lyophilic solution.

(iii) Define electrochemical series.

(iv) Define degree of freedom.

(v) State 2nd law of thermodynamics.

(vi) Name the elements used for alloying iron.

(vii) Define dry corrosion.

Marks

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

 (i) Explain aggregation method for preparation of colloidal solution.

 (ii) Explain caustic embrittlement.

 (iii) State properties of Teflon and PVC.

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

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

 b) Explain in brief Galvanic series of metals.

 c) Explain the phase diagram for the water system.

 d) Differentiate between Lyophilic and Lyophobic solution.

 e) Explain selection criteria of material of construction based on property of chemicals.

 f) Explain the mechanism of wet corrosion.

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

 a) Differentiate between reversible and irreversible process.

 b) Explain Langmuir adsorption isotherm.

 c) Explain in brief rubber lining and state its purpose.

 d) Find Δu, Q and W when 2 mol of hydrogen at 3 atm pressure expands reversibly and isothermally at 323K to a pressure of 1 atm assuming ideal behaviour.

 e) Draw the neat phase diagram of sulphur system.

 f) State any two industrial applications of PVC, polypropylene as material of construction.

Marks

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

    a) Give the mathematical statement of Gibb's phase rule and Express the terms involved in it.

    b) Explain the purpose of electroplating.

    c) State zeroth and third law of thermodynamics.

    d) Differentiate between physical and chemical adsorption.

    e) Explain the effect of temperature on corrosion.

    f) Write names of material of construction for storage of:

        (i) Commercial grade caustic lye

        (ii) Soda ash

        (iii) Fuming nitric acid

        (iv) Hydrochloric acid

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

    a) Explain Freundlich's adsorption isotherm.

    b) Explain sacrificial anodic method of corrosion prevention.

    c) Differentiate between:

        (i) Isothermal process and adiabatic process.

        (ii) Open and closed system.

    d) Give any four properties of mild steel.

    e) Derive Langmuir adsorption isotherm.

Marks

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

   a) Explain electroplating with neat sketch.

   b) Explain peptization method for preparation of colloidal solution.

   c) Define system and surrounding. What do you mean by isolates system?

   d) Derive the equation of work done in irreversible isothermal expansion of an ideal gas.

   e) Describe glass lining.

   f) Explain passivity of metals.

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