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16172

3 Hours / 100 Marks

Seat No.

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- 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.

Marks

1. **Attempt any FIVE of the following:** **20**
- a) State the second and third law of thermodynamics.
- b) Explain Langmuir Adsorption Isotherm.
- c) State and explain the factors affecting rate of corrosion.
- d) Give the classification of systems according to phase rule.
- e) Give the names of various materials of construction used in chemical industries. (Any eight)
- f) State and define the different types of processes. (Any four)
- g) Explain Erosion corrosion and Intergranular corrosion.

P.T.O.

- 2. Attempt any FOUR of the following:** **16**
- Derive the relation for reversible isothermal expansion of gases.
 - State Gibb's phase rule and define the terms involved.
 - Explain effect of temperature and pH on corrosion.
 - Explain Galvanic corrosion.
 - Which are the commonly used acids and alkalies? Suggest suitable material of construction for them. (Any four)
 - Calculate the work done when one mole of an ideal gas expands to ten times its original volume under reversible isothermal conditions.
- 3. Attempt any FOUR of the following:** **16**
- Find ΔU and Q when two moles of H_2 at 3 atm pressure expands reversibly and isothermally at 32 K to a pressure of 1 atm assuming ideal behaviour.
 - Explain phase diagram of sulphur system with sketch.
 - State and explain the applications of adsorption.
 - Differentiate between dry corrosion and wet corrosion.
 - Give four properties and uses of PTEE.
 - Give four properties and uses of SS-304.
- 4. Attempt any FOUR of the following:** **16**
- When a system is said to be in equilibrium?
 - What is a phase diagram? Draw and explain phase diagram for water system.
 - Differentiate between Lyophilic and Lyophobic sol.
 - State the use and application of sacrificial anodic protection against corrosion.
 - In a chemical industry which equipments require lining? Why?
 - Explain the aggregation methods of preparing colloidal solution.

- 5. Attempt any FOUR of the following:** **16**
- a) Explain hydrogen evolution type of mechanism of wet corrosion.
 - b) Draw and explain Galvanic cell.
 - c) Differentiate between reversible and irreversible process.
(Any four points)
 - d) Explain peptization
 - e) Write the classification of Engineering materials.
 - f) Which are the commonly used lining material? Briefly explain.
- 6. Attempt any FOUR of the following:** **16**
- a) Name two alloys of aluminium. Give their composition, properties and applications.
 - b) Explain special heat treatment and use of inhibitors for corrosion protection.
 - c) Explain System, Surrounding and Boundary in thermodynamics.
 - d) Differentiate between Intensive and Extensive properties.
(Any two)
 - e) Explain in brief glass lining.
 - f) Write difference between physical Adsorption and Chemical Adsorption.
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