

22233

21222

3 Hours / 70 Marks

Seat No.

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15 minutes extra for each hour

- 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. Attempt any FIVE of the following :

2 × 5 = 10

- (a) Distinguish between micro structure & nano-structure.
- (b) Define elasticity & plasticity.
- (c) Compare thermoplastic & thermosetting polymers.
- (d) Define corrosion with example.
- (e) Give the meaning of pig iron & cast iron.
- (f) Classify steel based on deoxidation practice.
- (g) List out the factors which affects on corrosion.

2. Attempt any THREE of the following :

4 × 3 = 12

- (a) Explain thermal insulator & electrical insulator with example.
- (b) Define chemical reactivity. Explain it with air, water & acid.
- (c) List out the engineering applications of ceramics.
- (d) Explain corrosion in acidic & alkaline environments.

- 3. Attempt any THREE of the following :** **4 × 3 = 12**
- (a) Explain the effects of Chromium, Copper, Magnesium & Nickel on Iron.
 - (b) List out the different prevention techniques for corrosion. Explain any one.
 - (c) List out the different properties of ceramics.
 - (d) Define – Specific heat, heat capacity, thermal conductivity & thermal stability.
- 4. Attempt any THREE of the following :** **4 × 3 = 12**
- (a) Identify relevant organic & inorganic insulations for given systems with justifications.
 - (i) Refrigeration system
 - (ii) Steam pipelines
 - (iii) Thermal incinerators
 - (iv) Storage vessels
 - (b) Calculate the heat in joules required to raise the temperature of 20 gms of water from 0 °C to 90 °C. $C_{pw} = 4.187 \text{ J/gm } ^\circ\text{C}$.
 - (c) Describe addition polymerization & condensation polymerization.
 - (d) List out the applications of special alloy steels (Heat resisting steels & stainless steel).
- 5. Attempt any TWO of the following :** **6 × 2 = 12**
- (a) List out different ferrous & non-ferrous materials used in daily life. Write any two alloy steel with its chemical composition.
 - (b) List out the characteristics of dry chlorine & wet chlorine. How these characteristics affects on corrosion ?
 - (c) List out the main properties & applications of Silicon Carbide & Aluminium oxide.
- 6. Attempt any TWO of the following :** **6 × 2 = 12**
- (a) Define Hardness, Malleability, Ductility, Brittleness, Tensile strength & Yield strength.
 - (b) Define resistivity & conductivity with mathematical expression. Also write its units.
 - (c) Write classification, properties & uses of metals & non-metals.
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