22233

**12425**

**3 Hours / 70 Marks** 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) Use of Non-programmable Electronic Pocket Calculator is permissible.

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

(8) Use of steam tables, logarithmic, Mollier's chart is permitted.

**Marks**

**1. Attempt any FIVE of the following :** **2 × 5 = 10**

(a) Draw NaC*l* crystal structure.

(b) Enlist the types of structure.

(c) Write down electrical properties of engineering materials (any four).

(d) Enlist physical properties of engineering materials (any four).

(e) Give two examples of each :

(i) Metals

(ii) Non-metals

(f) Give any two properties of biomaterial.

(g) Define Alloying.

**2. Attempt any THREE of the following : 4 × 3 = 12**

(a) Define thermal insulators and write down properties of thermal insulators (any four).

(b) Describe heat capacity as an extensive property.

(c) Describe chemical reactivity of mild steel with oxygen.

(d) Define : Thermal conductivity and thermal stability.

**3. Attempt any THREE of the following : 4 × 3 = 12**

(a) Differentiate between Thermoplastic and Thermosetting polymers (any four).

(b) Differentiate between metals and non-metals (any four).

(c) Explain Galvanising in corrosion prevention.

(d) Write down purposes of alloying (any four).

**4. Attempt any THREE of the following : 4 × 3 = 12**

(a) Write down properties of Glass Wool (any four) and Wool (any four).

(b) Define : (i) Fatigue (ii) Creep

(c) Define : (i) Ductility & (ii) Plasticity.

(d) Give application of ceramics (any eight).

(e) Explain sacrificial anodic method for protection of underground steel pipe.

**5. Attempt any TWO of the following : 6 × 2 = 12**

(a) Write down four mechanical and four electrical properties of ceramics and define Young's modulus.

(b) Give properties and uses of silicon carbide (any six of each).

(c) Explain in brief heat resisting steel.

**6. Attempt any TWO of the following :** **6 × 2 = 12**

(a) Define corrosion and explain effect of following factors on corrosion :

(i) Temperature

(ii) Moisture

(iii) pH value

(iv) Nature of electrolyte

(v) Presence of impurities in the environment

(b) Explain any two methods of preparation of alloys.

(c) Give classification of stainless steels and write down properties of Austenitic stainless steel (any four).