

22233

23124

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

Marks

1. Attempt the following (Solve any FIVE) :

5 × 2 = 10

- (a) List various material structure (any four).
- (b) Define density and porosity.
- (c) State seebeck effect and Peltier effect.
- (d) List factors affecting rate of corrosion (any four).
- (e) Give composition of grey cast iron.
- (f) Define corrosion and write one example of corrosion.
- (g) Draw NaCl crystal structure.

2. Attempt the following (Solve any THREE) :

3 × 4 = 12

- (a) Write the mathematical statement of Bragg's Law and meaning of each term involved in it.
- (b) Explain in brief the chemical reactivity of mild steel with moist air.
- (c) Explain any 4 thermal properties of engineering materials.
- (d) Write down engineering application of ceramics (any eight).



3. Attempt the following (Solve any THREE) :

3 × 4 = 12

- (a) Define resistivity and dielectric constant.
- (b) Give properties of mild steel and write any four uses of it.
- (c) Enlist physical properties of engineering materials. Describe porosity.
- (d) Write down characteristics of thermal insulators (any eight).

4. Attempt the following (Solve any THREE) :

3 × 4 = 12

- (a) Define :
 - (i) Hardness
 - (ii) Toughness
 - (iii) Malleability
 - (iv) Ductility
- (b) Give classification of ceramics :
 - (i) based on their application
 - (ii) based on compositionwith one example of each.
- (c) Explain in brief sacrificial anodic method with diagram.
- (d) Define polymerisation and differentiate between addition and condensation polymerisation (any two points).
- (e) Write classification of steels;
 - (i) based on carbon content
 - (ii) based on de-oxidation practice.

5. Attempt the following (Solve any TWO) :**2 × 6 = 12**

- (a) Enlist the properties of polypropylene (PP) (any six).
- (b) Discuss effect of following chemical element on properties of steel (any three);
 - (i) Carbon
 - (ii) Chromium
 - (iii) Copper
 - (iv) Nickel
 - (v) Manganese
 - (vi) Silicon.
- (c) Define Electrochemical corrosion & describe its mechanisms in details.

6. Attempt the following (Solve any TWO) :**2 × 6 = 12**

- (a) Define;
 - (i) thermoplastic polymers
 - (ii) thermosetting polymers with one example of each and differentiate between them (any four points).
 - (b) Give properties of medium carbon steel (any four) and its uses (any four)
 - (c) Suggest materials of construction for storage & handling of following chemicals :
 - (i) For storage of acetic acid and handling of acetic acid.
 - (ii) For storage of acetic anhydride and handling of acetic anhydride.
 - (iii) For storage of ethyl acetate and handling of ethyl acetate.
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