

22233

11920

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.
 - (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) Define Heat capacity and specific heat capacity.
- (b) Name any two mechanical properties of the engineering materials.
- (c) State the Bragg's Law.
- (d) Give classification of Steels.
- (e) List the major constituent of Ceramic.
- (f) Define thermosetting plastic.
- (g) List the inorganic insulating materials.

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P.T.O.

2. Attempt any THREE of the following :

4 × 3 = 12

- (a) Differentiate ferrous and non-ferrous materials.
- (b) On which factors rate of corrosion depends ?
- (c) Classify ceramics with example.
- (d) Define density. Measure density of air by specific gravity bottle. Calculate it.
- (e) Differentiate Nano-structure & Macro-structure.

3. Attempt any THREE of the following :

4 × 3 = 12

- (a) Explain condensation polymerization for phenyl formaldehyde.
- (b) Define tensile strength and yield strength.
- (c) Explain moist air reaction with Iron.
- (d) Differentiate the mechanism of corrosion in acidic and alkaline medium.

4. Attempt any THREE of the following :

4 × 3 = 12

- (a) Describe the crystal structure of glass with the help of Bragg's Law.
- (b) Calculate amount of heat required to raise the temperature of 50 grams of water from 30 °C to 70 °C.

Data : Specific heat of water 4.18 J/g °C.

- (c) Describe the heat capacity as an extensive property.
- (d) Differentiate metals and non-metals with respect to its physical and chemical properties.

5. Attempt any TWO of the following :

6 × 2 = 12

- (a) Define alloying. Classify the alloy steel on the basis of its constituents.
- (b) Explain the cladding mechanism for preparation of alloy steel.
- (c) Explain electro-plating theory for prevention of corrosion.

6. Attempt any TWO of the following :

6 × 2 = 12

- (a) Define polymerization. Give different types of polymerization process. Explain any one polymerization process with example.
 - (b) Explain the effect of following elements on Iron :
 - (i) Nickel
 - (ii) Silicon
 - (iii) Chromium
 - (iv) Magnesium
 - (c) Name the catalyst used in co-polymerization reaction. Why ?
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