23242

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.

Marks

1. **Attempt any FIVE of the following :**   **10**

(a) Draw NaC*l* crystal structure.

(b) List the major constituents of ceramic.

(c) Define corrosion and write one example of corrosion.

(d) Define thermosetting polymer.

(e) Define the Bragg's law.

(f) Define Ductility.

(g) What are Biomaterials ?

2. **Attempt any THREE of the following :**   **12**

(a) Define the following :

(i) Melting point

(ii) Specific heat

(iii) Heat capacity

(iv) Dielectric constant

(b) Give classification of metals and non-metals with examples.

(c) Write down engineering application of ceramics (any eight).

(d) Define Tensile strength & Yield strength.

3. Attempt any THREE of the following : 12

(a) Differentiate ferrous and non-ferrous material.

(b) Explain the condensation polymerization. Give an example.

(c) Describe the procedure to estimate the density of any liquid.

(d) Describe the classification of steel based on (i) Carbon content (ii) Deoxidation practice.

4. Attempt any THREE of the following : 12

(a) Give any four thermal insulators with one application each.

(b) Enlist the properties of polypropylene (PP) (any four).

(c) Define Electrochemical corrosion and describe its mechanisms in details.

(d) List out the different prevention techniques for corrosion. Explain any one.

(e) Explain chemical reactivity of iron with air.

5. Attempt any TWO of the following : 12

(a) Discuss effect of following chemical element on properties of steel (any three) :

(i) Magnesium

(ii) Chromium

(iii) Copper

(iv) Nickel

(v) Manganese

(vi) Silicon

(b) Give properties of medium carbon steel (any four) and its uses (any four).

(c) Calculate amount of heat required to raise the temperature of 50 grams of water from 20 °C to 80 °C. Data : specific heat of water 4.18 J/g°C.

6. **Attempt any TWO of the following :** 12

    (a)   Explain importance of Ziggler Natta catalyst in copolymerisation process.

    (b)   Define resistivity and conductivity with mathematical expression. Also write its units.

    (c)   Define :

        (i)   Hardness

        (ii)   Fatigue

        (iii) Malleability

        (iv) Elasticity

        (v)   Plasticity

        (vi) Creep

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