

22449

24225

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

**Marks**

1. Attempt any FIVE of the following:

10

- a) Define Packing factor.
- b) Define following –
  - i) System
  - ii) Phase.
- c) State the type of Cast Iron.
- d) State the principle of Heat Treatment.
- e) Define powder metallurgy.
- f) Define the term –
  - i) Unit cell
  - ii) Crystal structure.
- g) Sketch TTT diagram for eutectoid steel.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Classify various imperfection of crystal and write two application of imperfection.
  - b) Explain Eutectic System with sketch.
  - c) State Gibbs phase Rule
  - d) Differentiate between flame Hardening and Induction Hardening.
- 3. Attempt any THREE of the following:** **12**
- a) Describe mechanism nuclei formation and crystal grain growth.
  - b) Illustrate Nitriding process.
  - c) Explain principle of lever arm.
  - d) Classify Heat Treatment process.
- 4. Attempt any THREE of the following:** **12**
- a) Draw crystal structure FCC, BCC and HCP.
  - b) Draw Isomorphous system with all necessary nomenclature.
  - c) Enlist the advantages of carburising.
  - d) State the application powder Metallurgy.
  - e) Discuss line imperfection with neat sketch in crystal.
- 5. Attempt any TWO of the following:** **12**
- a) Discuss steps involved in powder metallurgy.
  - b) Write the application and composition of –
    - i) Stainless steel
    - ii) HSS
    - iii) Y-alloy.
  - c) Draw Iron-carbon equilibrium diagram.
- 6. Attempt any TWO of the following:** **12**
- a) State the properties of ferrous material.
  - b) Classify Engineering Material.
  - c) Write Atomization process in powder metallurgy with neat sketch.
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