

# 17303

**13141**

**3 Hours / 100 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.

**Marks**

1. **Attempt any TEN of the following:** **20**
- a) List any four thermal properties of materials.
  - b) Give chemical composition of Duralium.
  - c) State four properties of thermoplastics.
  - d) List Engineering applications of powder metallurgy.
  - e) Give classification of cast iron.

P.T.O.

- f) Define pure metals. Give two examples.
- g) List applications of nano materials.
- h) What is need of surface heat treatment?
- i) Define the following terms :
  - i) Strength
  - ii) Toughness
- j) State the objectives of heat treatment.
- k) What is sintering in powder metallurgy?
- l) Write composition of Muntz Metal. State its two uses.

**2. Attempt any FOUR of the following:**

**16**

- a) What is an equilibrium diagram? State its significance.
- b) Distinguish between carbon steels and cast iron.
- c) Draw TTT curves for Eutectoid (0.81. C) steel.
- d) Define critical temperatures. Give its significances.
- e) What is annealing? State its applications.
- f) Compare hardening and tempering process.

**3. Attempt any FOUR of the following: 16**

- a) Explain case carburising process.
- b) Give properties of bearing materials. List any four bearing materials.
- c) Compare White cast iron with Malleable cast iron. Give two uses.
- d) What is an alloy steel? State the effect of Nickel on properties of steel.
- e) Distinguish between thermoplastic and thermosetting.
- f) Suggest suitable materials for following mechanical components.
  - i) Leaf springs
  - ii) Guitar wire
  - iii) Connecting rod of I.C. Engine
  - iv) Machine beds.

**4. Attempt any FOUR of the following: 16**

- a) Write chemical composition of Brass and Bronze. Give two applications of any one.
- b) Explain HCHC and OHNS steels?
- c) Explain the process of spheroidizing annealing?
- d) What is infiltration and impregnation in powder metallurgy?
- e) What are polymers? State its characteristics.
- f) What is stainless steel? Give its applications.

- 5. Attempt any TWO of the following:** **16**
- a) Explain with sketch iron - carbon equilibrium diagram. Show on it critical temperatures and fields of steels and cast iron.
  - b) i) What is tool steel? List four properties of it.  
ii) Explain high speed steels.
  - c) Explain with sketch the process of Austempering and Martempering.
- 6. Attempt any FOUR of the following:** **16**
- a) List the four properties of BUNA and silicon rubber.
  - b) Compare destructive and non destructive testing.
  - c) What is Y alloy? Give its applications.
  - d) What is solid solutions? Give its types.
  - e) Explain induction hardening? List its merits and demerits.
  - f) Calculate packing efficiency of body centered cubic structure.
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