

# 17303

**21819**

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

**Marks**

- 1. Attempt any TEN of the following:** **20**
- Define Amorphous and crystalline material.
  - Draw equilibrium diagram for Eutetic system.
  - What is mean by Interstitial solid solution?
  - List any two applications of stress relief annealing.
  - Name the process for improving hardness of cutting tools.
  - Which quenching mediums used in hardening process (any two)?
  - State the principle of Nitriding process.
  - State the meaning of 40C8.
  - Write the composition of HSS.
  - Draw microstructure of Grey Cast Iron.
  - Select the material for:
    - Electric wire
    - Door handle

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- l) What is mean by thermosetting plastics?
- m) Write two uses of glasswool.
- n) List two types of composite materials.

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

- a) What is packing efficiency? State the equation and packing efficiency of FCC structure.
- b) Draw Iron- carbon phase equilibrium diagram.
- c) Define:
  - (i) Ferrite
  - (ii) Pearlite
  - (iii) Austenite
  - (iv) Cementite
- d) Differentiate between annealing and normalizing (four points)
- e) State composition and characteristics of HCHC steel.
- f) Explain self lubricating bearings.

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

- a) State the property of material:
  - (i) Making thin sheets
  - (ii) Making thin wires.
- b) Explain solidification of pure metal with the help of diagram.
- c) Explain Induction hardening process with suitable sketch.
- d) State the effect of:
  - (i) Chromium
  - (ii) Nickel
  - (iii) Carbon
  - (iv) Tungsten on properties of steel.

- e) Compare Brass and Bronze on the basis of composition, types and applications.
- f) Select material for:
  - (i) Tyre tube
  - (ii) Handle of cooker
  - (iii) Toys
  - (iv) Body of electrical fuse.

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

- a) Draw sketch of unit cell of BCC and FCC structure.
- b) State the C% in hyper and hypoeutectoid steels with the help of Iron carbon diagram and define.
- c) Classify steel on the basis of C% and give one application of each.
- d) What is carburizing? Explain any one method in detail.
- e) Compare Cast Iron and Steel (four points).
- f) State the desired characteristics of bearing materials.

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

- a) Draw TTT diagram for plain carbon steel.
- b) State the various hardening defects.
- c) Why tempering is necessary? List its types.
- d) State the characteristics and applications of stainless steel.
- e) Differentiate between thermoplastics and thermosetting plastics.
- f) Explain compacting and sintering process of powder metallurgy.

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

- a) Explain martempering process.
  - b) State meaning of:
    - (i) Fe 300
    - (ii) 20 C8
    - (iii) 40Cr4Mo3
    - (iv) 20Cr18Ni2
  - c) Write one application of:
    - (i) OHNS
    - (ii) High carbon steel
    - (iii) Grey C.I
    - (iv) Spring steel.
  - d) Write two properties and applications of ABS.
  - e) Differentiate between Destructive and NDT.
  - f) Suggest NDT method to detect hidden cracks in large metal pipes. Explain.
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