

17303

11920

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) Use of Non-programmable Electronic Pocket Calculator is permissible.
- (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

- a) Define the term
 - (i) Space lattice.
 - (ii) Unit cell.
- b) Explain the term automatic packing efficiency.
- c) Define -
 - (i) Solid solutions
 - (ii) Alloy.
- d) Define the term.
 - (i) Hypoeutectic
 - (ii) Hypereutectic.
- e) List any four objective of heat treatment.
- f) State the importance of TTT diagram.

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- g) State the meaning of $35M_n 6M_o3$.
- h) Give the classification of alloy steel.
- i) State the chemical composition of Muntz metal and Gun metal.
- j) What is Y-alloy? Give its uses.
- k) Give two characteristics and two uses of Bakelite.
- l) State the properties and applications of glasswool.
- m) List down the engineering applications of powder metallurgy.
- n) State the different Non destructive testing methods.

2. Attempt any FOUR of the following: 16

- a) Explain with neat sketch the BCC and FCC crystal structure.
- b) Draw Iron-Carbon equilibrium diagram and label it.
- c) Explain the eutectoid reaction and eutectic reaction.
- d) Draw and explain cooling curve of a pure metal and cooling curve of binary solid solution alloy.
- e) Explain the phases
 - (i) Austenite
 - (ii) Cementite.
- f) Give the classification of steel.

3. Attempt any FOUR of the following: 16

- a) Define annealing. State its objectives.
- b) Define hardening. State the various factors affecting on hardening.
- c) Explain the process of flame hardening with neat sketch.
- d) Differentiate between Austempering and Martempering.
- e) State the advantages of case hardening.
- f) State four advantages and four disadvantages of nitriding process.

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

- a) State the meaning of High speed tool steel. State also its properties.
- b) State the effect of following on properties of steel.
 - (i) Phosphorus
 - (ii) Sulphur
 - (iii) Silicon.
 - (iv) Chromium.
- c) State the type of cast iron and give two applications of each.
- d) State the properties of Gray cast iron.
- e) Define stainless steel. State its properties.
- f) State the meaning of spring steel. Give its chemical composition and two applications.

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

- a) Give four properties and four applications of muntz metal.
- b) State chemical composition of duralumin and four properties and two uses.
- c) State the desirable properties of bearing materials. List the materials used for bearing.
- d) What is thermoplastics? State its properties.
- e) State four properties and four applications of Acrylonitrile Butadiene Styrene (ABS).
- f) State the properties and applications of glass wool.

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

- a) State the various composite materials. State its properties.
 - b) State the advantages and limitations of powder metallurgy.
 - c) Explain with neat sketch X-ray radiography Non destructive testing method.
 - d) Explain the process of induction hardening.
 - e) Differentiate between annealing and normalizing process of steel.
 - f) Define the following terms -
 - (i) Stiffness.
 - (ii) Toughness
 - (iii) Malleability
 - (iv) Fatigue.
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