

# 17303

**15116**

**3 Hours / 100 Marks**

Seat No.

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- Instructions :** (1) All Questions are *compulsory*.  
(2) Illustrate your answers with neat sketches wherever necessary.  
(3) Figures to the right indicate full marks.  
(4) Assume suitable data, if necessary.  
(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any TEN :**

**20**

- Define ductility and hardness.
- Define corrosion.
- What is meant by coefficient of linear expansion ?
- What is cast iron ?
- State the properties of magnetic materials.
- Define heat treatment.
- What is nitriding ?
- Write down the characteristics of malleable cast iron.
- What are the applications of grey cast iron ?
- Give the applications and chemical composition of naval brass.
- Define polymer.
- What is tempering ?
- What is necessity of tempering ?
- What is flame hardening ?

**2. Attempt any FOUR :**

**16**

- Differentiate between dry corrosion and wet corrosion.
- State and explain Lever rule.

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- (c) Differentiate between annealing and normalizing.
- (d) What is carburizing ? What are its advantages ?
- (e) Differentiate between white cast iron and grey cast iron.
- (f) Classify mild steel according to percentage of carbon and give applications of each type.

**3. Attempt any FOUR :**

**16**

- (a) Give the composition and applications of gun metal.
- (b) What are the desirable properties of bearing metal ?
- (c) State the properties of ceramics.
- (d) Discuss properties and applications of nano materials.
- (e) Describe any two powder making processes.
- (f) List advantages and limitations of powder metallurgy.

**4. Attempt any FOUR :**

**16**

- (a) How the engineering materials are classified ? Give example of each.
- (b) What is allotropy ? State the allotropic changes of pure iron.
- (c) Define Austenite, Cementite, Bainite and Martensite.
- (d) What is case hardening ? What are its advantages ?
- (e) What is subcritical annealing ? What is its purpose ?
- (f) Draw the flow chart for the production of malleable cast iron.

**5. Attempt any FOUR :**

**16**

- (a) Draw iron-carbide phase diagram.
- (b) Write a short note on martensite.
- (c) Compare flame hardening and induction hardening.
- (d) What are the advantages and limitations of nitriding ?
- (e) Give the characteristics of grey CI and applications of nodular cast iron.
- (f) Give composition and applications of Naval brass and Babbitt metal.

**6. Attempt any FOUR :****16**

- (a) Explain tungsten carbide as a tool material.
  - (b) State different types of cast iron. Write down the applications of each type.
  - (c) What is composite material ? Give two examples.
  - (d) Define and explain the concept of powder metallurgy.
  - (e) Give four applications of brass and four applications of bronze.
  - (f) Give two applications of polyester and epoxy in industry.
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