

**6446**

**BOARD DIPLOMA EXAMINATION, (C-16)**

**MAY/JUNE—2023**

**DME - FOURTH SEMESTER EXAMINATION**

**ENGINEERING MATERIALS**

*Time : 3 Hours ]*

*[ Total Marks : 80*

**PART—A**

*3×10=30*

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **three** marks.  
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. State any three differences between destructive tests and nondestructive tests.
2. Define the terms (a) crystalline solids and (b) amorphous solids.
3. State the main raw materials used for production of iron.
4. Define the terms (a) interstitial solid solution and (b) substitutional solid solution.
5. State Gibbs phase rule. Specify the terms involved in it.
6. What is heat treatment? State the stages involved in it.
7. List any three purposes of heat treatment for steels.
8. What is an alloy? What is the purpose of alloying?
9. Name three types of aluminum alloy. Give example for each.
10. List out sequence of operations involved in powder metallurgy.

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## PART—B

10×5=50

- Instructions :** (1) Answer *any five* questions.  
(2) Each question carries **ten** marks.  
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

- 11.** With a neat sketch explain the procedure of Charpy impact test. 10
- 12.** Explain with a neat sketch of BCC and FCC crystal structure. 10
- 13.** Explain with a neat sketch of how cast-iron is manufactured in cupola furnace. 10
- 14.** Sketch iron–carbon equilibrium diagram and show the salient points. 10
- 15.** What is annealing? Explain with a neat sketch of (a) process annealing and (b) isothermal annealing. 10
- 16.** Give the composition, properties and uses of the following : 10  
(a) Muntz metal  
(b) Monel metal
- 17.** (a) State the effect of the following alloying elements on steels 5  
(i) chromium and (ii) molybdenum.  
(b) Define the terms (i) creep and (ii) fatigue. 5
- 18.** Explain the characteristics of metal powders. 10

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