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C16-M-401

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BOARD DIPLOMA EXAMINATION, (C-16)  
AUGUST/SEPTEMBER—2021  
DME - FOURTH SEMESTER EXAMINATION  
ENGINEERING MATERIALS

Time : 3 hours ]

[ Total Marks : 80

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PART—A

- 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. Write any three differences between destructive and non-destructive tests. 1×3=3
  
2. Define the following terms : 1½+1½=3
  - (a) Space lattice
  - (b) Unit cell
  
3. List out the various raw materials required for production of iron. 1×3=3
  
4. Define the following terms : 1½+1½=3
  - (a) Pearlite
  - (b) Ferrite
  
5. Define substitutional solid solution and interstitial solid solution. 1½+1½=3

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6. Define heat treatment. What are the stages in heat treatment? 1+2=3
7. What is the purpose of annealing in heat treatment? 3
8. State the properties of magnesium alloy. 3
9. Write a short note on babbitt metal. 3
10. What are the advantages of powder metallurgy? 3

### PART—B

**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. (a) Define the terms ductility and malleability.  $2\frac{1}{2}+2\frac{1}{2}=5$   
 (b) State the properties and uses of aluminium alloy.  $2\frac{1}{2}+2\frac{1}{2}=5$
12. Explain the Rockwell hardness test and compare B-scale with C-scale.  $5+5=10$
13. Determine the effective number of atoms in the following structures with neat sketches :  $5+5=10$   
 \* (a) Face centered cubic  
 (b) Body centered cubic
14. Draw a neat sketch of puddling furnace and explain its working.  $5+5=10$
15. Sketch the iron-carbon equilibrium diagram and mark the salient points. 10

16. Name the important heat treatment process of steel. Explain any two of them with neat sketches. 2+4+4=10
17. Write the composition, properties and applications of (a) grey cast iron and (b) white cast iron. 5+5=10
18. Explain the isostatic moulding and extruding process. 5+5=10

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