



C14-M-302

4250

BOARD DIPLOMA EXAMINATION, (C-14)  
MARCH/APRIL—2017  
DME—THIRD SEMESTER EXAMINATION  
MATERIAL SCIENCE

Time : 3 hours ]

[ Total Marks : 80

PART—A

3×10=30

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

1. Differentiate between destructive and non-destructive tests. 1½+1½=3
2. Describe the factors prompting grain size. 3
3. Name various raw materials required for production of iron. 3
4. What is thermal equilibrium diagram? 3
5. Distinguish between interstitial and substitutional solid solutions. 1½+1½=3
6. Define heat treatment. What are the stages in heat treatment? 1½+1½=3

/4250

1

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7. Differentiate <sup>\*</sup> between annealing and normalising.  $1\frac{1}{2}+1\frac{1}{2}=3$
8. State the influence of silicon and manganese on plain carbon steels.  $1\frac{1}{2}+1\frac{1}{2}=3$
9. Name three types of aluminium alloy. Give examples for each.  $1+1+1=3$
10. What is meant by powder metallurgy? 3

**PART—B**

10×5=50

**Instructions** : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Explain the ultrasonic testing with a neat sketch.  $4+6=10$
12. Determine the effective number of atoms in the following structures with neat sketches :  $5+5=10$
- (a) Face-centered cubic
- (b) Body-centered cubic
- <sup>\*</sup> 13. (a) Describe *L-D* converter with a neat sketch. 5
- (b) Compare *L-D* process with Bessemer process. 5
14. Sketch the iron-carbon equilibrium diagram and mark the salient points. 10
15. (a) Explain briefly the tempering of steel. 5
- (b) Distinguish between austempering and martempering. 5

16. Based on carbon content, how are the plain carbon steels classified? Discuss in detail the use of these steels. 10
17. (a) Write the applications of at least five metals.  $2\frac{1}{2}+2\frac{1}{2}=5$   
(b) State the properties and uses of lead and magnesium.  $2\frac{1}{2}+2\frac{1}{2}=5$
18. Explain the following processes :  $4+3+3=10$   
(a) Rolling  
(b) Explosive compacting  
(c) Slip casting

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