



C14-M-302

4250

BOARD DIPLOMA EXAMINATION, (C-14)
OCT/NOV—2016
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) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Write the differences between destructive and non-destructive tests. 3
2. What is the effect of grain size on mechanical properties? 3
3. List any six methods of steel making. 3
4. Calculate the percentage of cementite and pearlite in 1.2% carbon steel. 3
5. Define the following : $1\frac{1}{2}+1\frac{1}{2}=3$
 - (a) Ferrite
 - (b) Austenite

/4250

1

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6. What is meant by case-hardening? What are various case-hardening processes? 1+2=3
7. Write about vacuum hardening process. 3
8. What is the effect of carbon on properties of steel? 3
9. Write the composition, properties and uses of duralumin. 1+1+1=3
10. List different methods for compacting the metal powders. 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 Rockwell hardness test and compare B-scale with C-scale. 5+5=10
12. (a) Define the term 'recrystallization'. 2
 (b) Describe the solidification of pure metal with a neat sketch. 3+5=8
13. Draw a neat sketch of puddling furnace and explain how wrought iron is produced from it. 10
14. (a) Explain cooling curve of pure iron. 4
 (b) Distinguish among hypoeutectoid, eutectoid and hyper-eutectoid steels. 6
15. Name the important heat-treatment processes of steel. Explain any two of them with neat sketches. 4+6=10

- 16.** Write down the composition, properties and applications of the following : 10
- (a) Mild steel
 - (b) Gray cast iron
 - (c) Malleable cast iron
- 17.** (a) Define the following : 2+2+1=5
- (i) Brittleness
 - (ii) Impact strength
 - (iii) Fatigue
- (b) What are the desired properties of bearing metal? Name any three types of bearing metal. 2+3=5
- 18.** Describe the characteristics of metal powders used in powder metallurgy. 10

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