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C16–M–401

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BOARD DIPLOMA EXAMINATION, (C–16)

MARCH/APRIL—2018

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. What is impact strength of a material? 3

2. Distinguish between crystalline and amorphous solids. 3

3. What is slag? Where is it used? 3

4. Define the following : 1½+1½=3

(a) Pearlite

(b) Cementite

5. What is steel? Distinguish between hypoeutectoid and hypereutectoid steels. 1+2=3

6. Hardening should never be a final heat treatment for steel. Why? 3

7. List any six methods of heat treatment of steel. 3

8. What is alloy steel? Why are alloying elements added to steel? 3

9. Name three types of aluminium alloy. Give example for each. 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. Describe the solidification of pure metal with a neat sketch. 5+5=10

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) Define solid solution. Distinguish between substitutional and interstitial solid solutions. 6

15. Name the important heat treatment processes of steel. Explain any two of them with neat sketches. 4+6=10

16. Based on carbon content, how are the plain carbon steels classified? Discuss in detail the uses of these steels. 10

17. *(a)* Define the following : 2+2+1=5

(i) Hardness

(ii) Toughness

(iii) Ductility

(b) State the properties and uses of lead and magnesium. 2½+2½=5

18. Describe briefly various methods of producing metal powders. 10

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