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C14–M–302

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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

7. Differentiate between annealing and normalising. 1½+1½=3

8. State the influence of silicon and manganese on plain carbon steels. 1½+1½=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

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. 2½+2½=5

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

18. Explain the following processes : 4+3+3=10

(a) Rolling

(b) Explosive compacting

(c) Slip casting

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