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C09–M–404

3504

BOARD DIPLOMA EXAMINATION, (C–09)

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. State the principal of ultrasonic test. 3

2. What is dendrite? How are they formed? 3

3. Draw a neat sketch of electric arc furnace indicating the parts. 3

4. Define the following structures : 1½+1½

(a) Ferrite

(b) Ledeburite

5. What is lever rule? 3

6. What is vacuum hardening? 3

7. State any three purposes of heat treatment process. 3

8. What is the effect of carbon on mechanical properties on steel? 3

9. Write the properties of grey cast iron. 3

10. What is green strength of a metal powder? 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. Write short notes on the following tests : 5+5

(a) X-ray test

(b) Magnetic detection test

12. Determine the effective number of atoms in the following structures with a neat sketch : 3+3+4

(a) Face-centered cubic

(b) Body-centered cubic

(c) Hexagonal close packed

13. With a neat sketch, explain the process of steel making using LD process. 10

14. Sketch iron-carbon equilibrium diagram and write all the reactions with reference to this diagram. 10

15. Explain the following heat treatment processes : 5+5

(a) Full annealing

(b) Normalising

16. Write the composition and properties of the following : 3+3+4

(a) Monel metal

(b) Constantan

(c) Phosphor bronze

17. Explain any three methods of preparing metal powders with neat sketch. 4+3+3

18. *(a)* What are the properties of—

(i) zinc;

(ii) tin? 2½+2½

(b) Define the following mechanical properties : 2½+2½

(i) Toughness

(ii) Compressive strength

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