C09–M–404

3504

BOARD DIPLOMA EXAMINATION, (C–09)
OCT/NOV—2017
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. Write the differences between destructive and non-destructive tests.   3

2. Sketch neatly the body-centered cubic crystal structure and give any two examples of it.   3

3. What is the function of coke and limestone in the charge of blast furnace?   1½+1½

4. What are hypo-eutectoid, eutectoid and hyper-eutectoid steels?   3

5. Calculate the percentage of cementite and pearlite in 1·3% carbon steel.   3

6. What is sub-zero heat treatment?   3

7. What is meant by pack carburising?   3

8. What is the influence of silicon and phosphorus on plain carbon steels?   3

9. Write any three properties and three uses of copper.　　　3

10. List any six methods of forming to shape in powder metallurgy.　　　3

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PART—B　　　　10×5=50

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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 procedure for conducting tensile test on universal testing machine, with a sketch.　　　10

12. Explain the phenomenon of crystallization of pure metal with neat sketches.　　　10

13. Explain the procedure of manufacturing pig iron from blast furnace with a neat sketch.　　　10

14. *(a)* With a neat sketch explain the cooling curve of pure iron.　　　4

　　(b) Explain the following reactions in iron carbon equilibrium diagram :　　　6

　　　(i) Peritectic reaction

　　　(ii) Eutectic reaction

15. Describe the following :　　　4+3+3

　　(a) Process annealing

　　(b) Spheroidise annealing

16. Give the composition and uses of the following :　　　4+3+3

　　(a) Muntz metal

　　(b) Gun metal

　　(c) Aluminium bronze

17. Write a short note on following characteristics of metal powder :

5×2

    (a) Shape

    (b) Flowability

    (c) Purity

    (d) Apparent density

    (e) Compressibility

18. *(a)* Write any five desirable properties of bearing metals.   5

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

        (i) Hardness

        (ii) Fatigue

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