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C14–M–302

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BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2015

DME—THIRD SEMESTER EXAMINATION

MATERIALS 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. Distinguish between destructive and non-destructive tests. 1½+1½=3

2. State the effect of grain size on mechanical properties. 3

3. Draw the flow diagram for extraction of iron and steel from its ore. 3

4. Write Gibbs phase rule and abbreviate the terms involved in it. 1+2=3

5. Sketch the cooling curve for a pure metal with slow cooling. 3

6. State any three differences between annealing and normalising. 1×3=3

7. State any three purposes of heat treatment of steel. 1×3=3

8. Define plain carbon steels. Mention the types of plain carbon steels. 1+2=3

9. Write the uses of lead, tin and zinc. 1+1+1=3

10. List out the stages involved in manufacturing of parts by the powder metallurgy technique. 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. Draw dimension sketches of test specimen for charpy and izod test. Explain the procedure to conduct impact test. 5+5=10

12. How the space lattice mainly classified? Explain each with neat sketch. 1+3+3+3=10

13. Explain how cast iron is manufactured in cupola furnace with neat sketch. 5+5=10

14. Draw a neat sketch of iron-carbon equilibrium diagram. Showing the various phases of iron-carbon alloy system. 5+5=10

15. Name any four important heat treatment processes of steel. Explain any two of them with temperature diagrams. 2+4+4=10

16. Write down the composition, properties and applications of—

(a) gray cast iron;

(b) white cast iron; 5+5=10

17. *(a)* State the advantages and limitations of powder metallurgy process. 6

(b) Write the applications of powder metallurgy process. 4

18. *(a)* What are the applications of engineering materials used in —

(i) various mechanical process;

(ii) various industries? 2½+2½=5

(b) Write the composition and applications of constantan and monel metal. 5

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