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C14–M–302

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BOARD DIPLOMA EXAMINATION, (C–14)

MARCH/APRIL—2018

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) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Differentiate destructive and nondestructive tests.

2. Define space lattice and unit cell.

3. State the products of blast furnace and their uses.

4. Explain the cooling curve of pure iron with a sketch.

5. State Gibbs' phase rule and abbreviate the terms involve in it.

6. Define heat treatment. What all are the stages in heat treatment?

7. State any three purposes of heat treatment of steel.

8. Why is grey cast iron particularly suitable for lathe beds?

9. Why are alloying elements added to steel?

10. List any three applications of powder metallurgy.

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 radiography tests.

12. Sketch and explain BCC, FCC and HCP structures and give two examples.

13. Sketch and explain how cast iron is manufactured in cupola furnace.

14. Sketch iron carbon equilibrium diagram with reference of this diagram. Define eutectic, eutectoid and peritectic reactions.

15. Explain heat treatment processes of *(a)* tempering and *(b)* hardening.

16. What is malleable cast iron? State its properties and applications.

17. *(a)* Give the compositions and applications of the following :

(i) Muntz metal

(ii) Monel metal

(b) Define the following :

(i) Fatigue

(ii) Creep

(iii) Toughness

(iv) Hardness

18. State the advantages and limitations of powder metallurgy.

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