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C14–M–302

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BOARD DIPLOMA EXAMINATION, (C–14)

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

1. Write short note on X-ray test.

2. What is the effect of grain size on mechanical properties?

3. Name the charging materials for blast furnace.

4. State Gibb's phase rule and explain the terms involved in it.

5. List out six methods of heat treatment of steel.

6. What is nutriding? How is it done?

7. Write difference between hypereutectoid steel and hyperrutectoid steel.

8. List out three properties and uses of steel.

9. Define brass and bronze.

10. What is meant by 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 with a neat sketch of Rockwell hardness test.

12. *(a)* Determine the effective number of atoms in the following structure with a neat sketch :

(i) FCC

(ii) BCC

(b) Write difference between crystalline and amorphous solids.

13. Explain the following :

(a) Bessemer process of steel making

(b) L-D process of steel making

14. *(a)* Explain cooling curve of pure iron.

(b) Define the following :

(i) Pearlite

(ii) Cementite

15. Explain the following heat treatment process :

(a) Normalizing

(b) Anneling

(c) Tempering

16. Write down the composition properties and applications of—

(a) grey cast iron;

(b) spheroidal cast iron;

(c) white cast iron.

17. *(a)* What are the desired properties of bearing metals.

(b) Define the following :

(i) Fatigue

(ii) Creep

(iii) Toughness

(iv) Hardness

18. Describe briefly various methods of producing metal powders.

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