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C09–M–404

3504

BOARD DIPLOMA EXAMINATION, (C–09)

MARCH/APRIL—2016

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 principle of radiography test.

2. Write brief notes on the following :

(a) Grain boundary

(b) Grain size

3. What are the functions of coke in iron and steel making?

4. Write the peritectic reaction in iron-carbon diagram.

5. Define alloy and allotropy.

6. Name the various methods of heat treatment of steel.

7. How the steels containing less than 0·8% carbon content are hardened?

8. What is nickel? List out the most commonly used nickel alloys.

9. State the composition, properties and uses of bell metal.

10. Write any six characteristics of metal powders.

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 Brinell hardness test. State its advantages, limitations and application.

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

(i) Face-centered cubic

(ii) Body-centered cubic

(b) Distinguish between crystalline and amorphous solids.

13. Explain the process of steel making, using electric arc process.

14. *(a)* Explain allotropic forms of pure iron with a neat sketch.

(b) Sketch the iron-carbon equilibrium diagram and mark the salient points.

15. *(a)* Describe the process of nitriding in detail.

(b) Write the advantages and disadvantages of gas carburising over solid carburising.

16. State the composition, properties and applications of the following :

(a) Nickel steel

(b) 18/8 stainless steel

(c) HSS

17. Explain the characteristics of metal powders used in powder metallurgy.

18. *(a)* Write any five applications of the following engineering materials :

(i) Steel

(ii) Cast iron

(b) What are the variables to be considered while classifying cast iron? Mention any four types of cast irons.

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