



C09-M-404

3504

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—2014

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 Piezoelectric effect.
2. What conditions will lead to a fine grain upon solidification?
3. List out two iron ores. How do you utilize the blast furnace slag?
4. Explain the peritectic reaction in iron-carbon diagram.
5. Define solid solution. Mention the types of solid solution.
6. Distinguish between hardening and tempering.
7. Hardening should never be a final heat treatment for steel. Why?
8. State the composition, properties and uses of leaded brass.
9. List the properties and uses of Monel metal.
10. Write any three advantages and limitations 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 criterion for valuation is the content but not the length of the answer.

- 11.** Explain Rockwell hardness test. Distinguish the B-scale with C-scale.
- 12.** Determine the effective number of atoms in the following structures with a neat sketch :
- (a) Face-centered cubic
 - (b) Body-centered cubic
- 13.** Explain the sequence of operations for the production of steel from iron ore.
- 14.** Sketch the iron-carbon equilibrium diagram and show the salient points, phases and critical points.
- 15.** (a) State the differences between nitriding and cyaniding.
(b) Explain (i) carbonitriding and (ii) vacuum hardening processes.
- 16.** Explain the composition, properties and uses of the following :
- (a) High-speed steel
 - (b) Chromium steel
 - (c) 18/8 stainless steel
- 17.** Describe the characteristics of metal powders used in powder metallurgy.
- 18.** (a) Define the following :
- (i) Brittleness
 - (ii) Impact strength
 - (iii) Fatigue
- (b) Why is gray cast iron particularly suitable for lathe beds?

*
