* 3 5 0 4 *

C09–M–404

3504

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—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. Distinguish Rockwell B and Rockwell C scales with respect to load, indentor and applications.

2. List out three common types of crystalline structure.

3. What is flux? Name the flux used in production of iron.

4. Define phase and solid solution.

5. Write the eutectic reaction in iron-carbon diagram.

6. What is meant by case hardening? What are various case hardening processes?

7. Define heat treatment. What are stages in heat treatment?

8. What is the influence of phosphorus and sulphur on plain carbon steels?

9. What are the effects of combined carbon and free carbon on the properties of cast iron?

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 the criterion for valuation is the content but not the length of the answer.

11. Explain ultrasonic testing with a neat sketch.

12. What are the factors promoting grain size? What is the effect of grain size on mechanical properties?

13. *(a)* Describe L-D converter with a neat sketch.

(b) Compare L-D process with Bessemer process.

14. Sketch the iron-carbon equilibrium diagram and define eutectoid, hypereutectoid, hypoeutectoid steels.

15. *(a)* Explain the following :

(i) Full annealing

(ii) Tempering

(b) Distinguish between annealing and normalizing.

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

(a) Muntz metal

(b) Gun metal

(c) Admiral brass

(d) Naval brass

17. Explain the sequence of operations in producing a component in powder metallurgy.

18. *(a)* Write short notes on the following :

(i) Brittleness

(ii) Impact strength

(b) Write down the composition, properties and uses of nickel alloys of the following :

(i) German silver

(ii) Hastelloy

★ ★ ★