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C16-M–401

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BOARD DIPLOMA EXAMINATION, (C-16)

JANUARY/FEBRUARY—2022

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. Draw stress-strain diagram for ductile material and indicate salient points on it.

2. Define *(a)* space lattice and *(b)* unit cell.

3. What is the product of blast furnace? List out the raw materials charged into it.

4. State Gibbs phase rule and abbreviate the terms involved in it.

5. Identify the allotropic forms of iron with the help of cooling curve of pure iron.

6. Hardening should never be a final heat treatment for steel. Why?

7. Differentiate between annealing and normalizing.

8. Write a short note on Babbitt metal.

9. State the composition, properties and uses of admiralty brass.

10. Define the terms flowability and green strength.

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. *(a)* Define the terms fatigue strength and toughness.

(b) Explain the composition, properties and applications of any two copper alloys.

12. State any three differences between destructive and non-destructive tests. With a neat sketch explain any one of the non-destructive test in detail.

13. Explain any three space lattices in which metals crystallize with neat sketches.

14. Sketch and explain how cast iron is manufactured in Cupola furnace.

15. *(a)* Draw and describe cooling curve for pure metal.

(b) Define solid solution. Distinguish substitutional solid solution from interstitial solid solution.

16. Explain the following heat treatment processes :

(a) Carburizing

(b) Nitriding

(c) Sub-zero treatment

17. *(a)* Distinguish gray cast iron from white cast iron.

(b) Explain how malleable cast iron is produced.

18. *(a)* State the advantages of powder metallurgy.

(b) Explain isostatic moulding and extruding process.

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