



C20-M-302

7257

BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DME – THIRD 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. List any six mechanical properties.
2. Define composite material. Write its classification based on matrix material.
3. State the principle of piezo electric effect.
4. Define space lattice and unit cell.
5. What are the raw materials charged into blast furnace?
6. State Gibb's phase rule and abbreviate the terms involved in it.
7. Write the differences between substitutional solid solution and interstitial solid solution.
8. What is the purpose of heat treatment of steel?
9. Write the three properties of Babbitt metals.
10. What is the effect of carbon on properties of steel?

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

- 11.** (a) Draw a neat sketch of UTM and explain the procedure for conducting tensile test. 8

(OR)

- (b) What is the principle of radiography test? Explain X-ray radiography with a neat sketch. 8

- 12.** (a) Describe the factors affecting grain size. 4

- (b) What is the effect of grain size on properties? 4

(OR)

- (c) Draw the neat sketches of the following crystal structure and determine effective number of atoms in each structure : 8

(i) FCC

(ii) HCP

- 13.** (a) Sketch and explain how cast iron is manufactured in cupola furnace. 8

(OR)

- (b) Explain L-D converter with a neat sketch. 8

- 14.** (a) Draw the iron-carbon equilibrium diagram and with reference to this diagram, write peritectic, eutectic and eutectoid reactions. 8

(OR)

- (b) (i) Explain normalizing. 5

- (ii) Write any three differences between annealing and normalizing. 3

- 15.** (a) Write composition and properties of (i) white cast iron and (ii) malleable cast iron. 8

(OR)

- (b) Write composition and properties of (i) any two aluminum alloys and (ii) any two copper alloys. 8

PART—C

10×1=10

- Instructions :** (1) Answer the following question.
(2) The question carries **ten** marks.
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

- 16.** Write effect of any three alloying elements on mechanical properties of steel. What are the industrial application of alloy steel?

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