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C20-M-302

7257

**BOARD DIPLOMA EXAMINATION, (C-20)
JUNE/JULY—2022**

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 various mechanical processes where do engineering materials be used.
2. Define the following terms with respect to properties of engineering materials :
 - (a) Strength
 - (b) Ductility
3. Explain the following terms with respect to a metal subjected to tension :
 - (a) Percentage of elongation
 - (b) Percentage reduction in area
4. List any three metals which do possess BCC structure.
5. What are the raw materials required for production of iron? What role do they play in production of iron?

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6. State Gibbs phase rule and abbreviate the terms involved in it.
7. Draw the cooling curve which does represent the process of martempering.
8. Write the eutectic reaction in iron-carbon equilibrium diagram.
9. List any three properties and uses of magnesium alloys.
10. Classify plain carbon steel with respect to carbon content.

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. Explain the principle of impact test and features of Charpy and Izod tests.

(OR)

Describe a non-destructive testing method which uses piezo-electric crystal.

12. Explain the phenomenon of dendritic crystallisation with legible sketches.

(OR)

Calculate the effective number of atoms in the following metallic structures with legible sketches :

- (a) FCC
- (b) HCP

13. Describe briefly the constructional features of open-hearth process with a legible sketch.

(OR)

Explain L-D converter with a legible sketch.

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14. Show the temperature ranges of the following heat treatment processes in iron-carbon equilibrium diagram :

- (a) Full annealing
- (b) Isothermal annealing
- (c) Spheroidising annealing
- (d) Process annealing

(OR)

Show the temperature ranges of the following heat treatment processes in iron-carbon equilibrium diagram :

- (a) Hardening
- (b) High temperature tempering
- (c) Medium temperature tempering
- (d) Low temperature tempering

15. Write down the composition, properties and applications of (a) chilled cast iron and (b) malleable cast iron.

(OR)

Write down the composition, properties and applications of (a) duralumin and (b) magnalium.

PART—C

10×1=10

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

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16. Discuss the significance of various case hardening processes in engineering practice.

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