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C16-M-401

**6446**

**BOARD DIPLOMA EXAMINATION, (C-16)**

**JUNE/JULY—2022**

**DME - FOURTH SEMESTER EXAMINATION**

**ENGINEERING MATERIALS**

*Time : 3 hours ]*

*[ Total Marks : 80*

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**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. Define the following terms :
  - (a) Percentage of elongation
  - (b) Percentage of reduction in area
2. Sketch the crystal structure of FCC neatly. Give three examples of FCC structure.
3. State the advantages of steel making in electric furnace.
4. Define (a) phase and (b) solid solution.
5. What is steel? Distinguish hypo eutectoid steel from hyper eutectoid steel.
6. State the importance of tempering and classify tempering processes.
7. List out any six methods of heat treatment of steel.
8. Write short notes on (a) brass and (b) bronze.

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9. What is alloy steel? What are the desirable properties in tool steel?
10. State three advantages and disadvantages 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. (a) Explain the terms creep and fatigue.  
(b) Write short notes on (i) Muntz metal and (ii) Monel metal.
12. Explain ultrasonic testing with a neat sketch.
13. (a) Define the term recrystallisation.  
(b) Describe the solidification of pure iron with a neat sketch.
14. Explain the process of steel making in open hearth furnace. Draw the neat sketch of the furnace and label the parts.
15. Sketch iron-carbon equilibrium diagram and mark the salient points.
16. Name the important heat treatment processes of steel. Explain any two of them with neat sketches.
17. Write short notes on (a) stainless steel, (b) high speed steel and (c) gray cast iron.
18. Explain the following processes :
  - (a) Rolling
  - (b) Explosive compacting
  - (c) Slip casting

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