

7257

BOARD DIPLOMA EXAMINATION, (C-20)  
NOVEMBER/DECEMBER—2022  
DME – THIRD 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. Name any six applications of engineering materials.
2. Define the terms (a) hardness and (b) brittleness.
3. Classify destructive and non-destructive tests in any three aspects.
4. Define space lattice and unit cell.
5. What are the products of blast furnace? List the applications of each product.
- \* 6. List the purposes of heat treatment for steel.
7. State Gibbs phase rule and abbreviate the terms involved in it.
8. Mention the temperatures in the following reactions observed in iron carbon diagram :  
Peritectic Reaction, Eutectic Reaction, Eutectoid Reaction.
9. What are the elements present in ternary alloy steels?
10. Write the composition and uses of gun metal.

## PART—B

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- 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 ultrasonic test with a legible sketch. 5+3

**(OR)**

Explain Rockwell hardness test and compare B-scale with C-scale. 5+3

**12.** List out the metallic structures and explain them with legible sketches. 8

**(OR)**

Explain the terms recovery, recrystallization and grain growth. 8

**13.** Explain the procedure of manufacturing pig iron from blast furnace. 8

**(OR)**

Explain the manufacturing of steel from Bessmer process with a legible sketch. 8

**14.** Name the important heat treatment processes of steel and explain any two of them with legible sketches. 8

**(OR)**

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Sketch the iron carbon equilibrium diagram and indicate the salient points on it. 8

**15.** Write down the composition, properties and applications of (a) German silver and (b) invar. 8

**(OR)**

Write down the composition, properties and applications of (a) 18/8 steel and (b) HSS. 8

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**PART—C**

10×1=10

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- 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.** Suggest the appropriate heat treatment process to harden the gear teeth of a gear and explain it.

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