



C16-M-401

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**BOARD DIPLOMA EXAMINATION, (C-16)
OCTOBER/NOVEMBER—2023
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. State three differences between Charpy test and Izod test.
2. Distinguish between crystalline and amorphous solids.
3. What is slag? Where is it used?
4. Write the eutectoid reaction in iron-carbon equilibrium diagram.
5. Identify the allotropic forms of iron with the help of cooling curve of pure iron.
6. List out any six methods of heat treatment of steel.
7. Distinguish between hardening and tempering.
8. What is alloy steel? Why are alloying elements added to steel?
9. Write the composition of 18-4-1 high speed steel and its applications.
10. Define the terms (a) flow ability and (b) green strength.

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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 (a) creep and (b) fatigue.
(b) State the properties and uses of zinc, tin and lead.
- 12.** Explain Rockwell hardness test and compare B-scale with C-scale.
- 13.** Describe the factors promoting grain size of steel. What is the effect of grain size on mechanical properties?
- 14.** Describe the method of producing pig iron in blast furnace.
- 15.** Sketch the iron-carbon equilibrium diagram and mark the salient points on it.
- 16.** Explain the following heat treatment processes :
(a) Carburizing
(b) Nitriding
(c) Sub-zero treatment
(d) Vacuum hardening
- 17.** Write the composition, properties and applications of the following engineering materials :
(a) Steel
(b) Cast iron
- 18.** (a) List out the methods of preparing metal powders and explain any two methods with a neat sketch.
(b) List out the characteristics of metal powders.

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