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C20-M–302

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BOARD DIPLOMA EXAMINATION, (C-20)

FEBRUARY/MARCH — 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. Classify metals which do not contain ferrous and give one example for each.

2. Define the following mechanical properties of engineering materials :

(a) Creep strength

(b) Fatigue strength

3. Explain the following terms with respect to a metal subjected to compression :

(a) Percentage of reduction in length

(b) Percentage increase in area

4. Distinguish between crystalline and amorphous solids in three aspects.

5. What is the function of coke and calcium carbonate in the charge of blast furnace?

6. Explain peritectic reaction with reference to iron carbon system.

7. State Gibbs phase rule and abbreviate the terms involved in it.

8. Calculate the percentage of phases exist in 0.8% carbon in iron-carbon system.

9. What are the elements present in ternary alloy steels?

10. Write the properties and uses of Muntz metal.

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 non-destructive test that uses X-rays and gamma-rays.

(OR)

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

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

(OR)

Explain the terms recovery, recrystallization and grain growth.

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

(OR)

Explain electric arc furnace for making steel.

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

(OR)

Explain different phases on decomposition of austenite with the aid of CCT curves.

15. Write down the composition, properties and applications of *(a)* constantan and *(b)* inconel.

(OR)

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

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.

16. Discuss the four heat treatment processes to increase the hardness of surface layer by changing the chemical composition on surface layer only.

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