

Development.
governing system.

of Questions : 09

Total No. of Pages : 02

B.Tech. (Mechanical Engineering) (Sem -4)

MATERIALS ENGINEERING

Subject Code : BTME404-18

M.Code : 77549

Date of Examination : 29-11-2023

3 Hrs.

Max. Marks : 50

INSTRUCTIONS TO CANDIDATES :

SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.

SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.

SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Define the term normalizing.
- b) Define Phase.
- c) Differentiate between point and line defects.
- d) Mention the factors which affect harden-ability.
- e) What is a eutectic and eutectoid reaction?
- f) Name different case hardening techniques.
- g) What are the objects of annealing?
- h) Enlist the various furnaces being used for heat treatment.
- i) Describe one method by which the properties of Cast iron may be improved.
- j) What is atomic packing factor of a crystal structure?

SECTION-B

2. While quenching, a material was found to develop cracks. What are the possible causes of this damage? Suggest remedies.
3. Explain Principle, methods and advantages of Induction hardening with a neat sketch.
4. Draw and Explain T-T-T Diagram.
5. Copper has an FCC structure and an atom radius of 1.278 \AA . Calculate its density. Given atomic weight of copper is 63.5 g/mol and Avogadro's number as 0.602×10^{24} atoms/mol.
6. Differentiate between :
 - a) Solid Solution and Compound
 - b) Pearlite and Bainite.

SECTION-C

7. What do you mean by Iron Carbon Equilibrium Diagram? Draw Line Diagram of Iron Carbon Equilibrium diagram and explain peritectic reaction.
8. What is the difference between recovery, re-crystallization and grain growth? How do crystallization and grain growth affect the different mechanical properties? Explain with a suitable example.
9. Discuss the classification of alloying elements in steels. Explain the effects of adding Si, W and Al on the properties of steels.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.