

GANPAT UNIVERSITY
M.TECH SEM. I (ME-AMT)
CBCS REGULAR THEORY EXAMINATION JAN -2013
3ME101 - MATERIAL SCIENCE

Time: 3 Hours

Total Marks: 70

Instructions:

- 1). All questions are **compulsory**.
- 2). Figures to the **right** indicate full marks.
- 3). Answers to the two sections must be written in **separate** answer books.
- 4). Assume all necessary data.

SECTION - I

Que:-1

12

- (A) What is line defect? Differentiate between edge dislocation and screw dislocation.
- (B) Define and explain the following terms:
 i) Burger vector
 ii) Low angle grain boundary
 iii) High angle grain boundary
- (C) Explain point defects with neat sketch.

Que:-2

11

- (A) Name different strengthening mechanism in details. Explain strain hardening in detail.
- (B) What is precipitation hardening? Explain the process of precipitation hardening in detail.
- (C) Explain strengthening mechanism in solid and martensitic strengthening.

OR

Que:-2

11

- (A) What is fracture? Name difference mechanism of fracture in solid. Explain Griffith theory for brittle fracture.
- (B) Difference between brittle fracture and ductile fracture.
- (C) Write short note on grain boundary strengthening.

Que:-3

12

- (A) Explain the stages in development of ductile fracture.
- (B) What is fatigue? Explain the mechanism of fracture taking place by fatigue failure of an article.
- (C) How can be fatigue resistance of material is improve?

OR

Que:-3

12

- (A) Explain the S-N curve and Endurance limit for article made of steel.
- (B) What is creep? Explain the creep curve in detail.
- (C) Differentiate between fatigue failure and creep.

SECTION - II

Que:-4

- (A) What is secondary bonding in solid? Explain Dispersion bond with neat sketch.
- (B) Differentiate between crystalline and non crystalline material along with structure.
- (C) Differentiate between ionic, covalent and metallic bonding in solid.

12

OR

Que:-4

- (A) What is meant by grain boundary? Enlist difference between Twist boundary and Twin boundary.
- (B) What is point defect? Explain with the help of sketch schottky defect and frenkel defect.
- (C) List different types of imperfection in crystal structure. Differentiate between edge dislocation and screw dislocation.

12

Que:-5

- (A) Enlist ceramic forming methods and explain any one of them in detail.
- (B) What is a silicate structure? Explain with neat sketch silicate structures.
- (C) What is co ordination number? Explain co ordination number with following type of structure:
i) AX, ii) AmXp, iii) AmBnXp

11

OR

Que:-5

- (A) What is composite? With examples discuss the large particle composites.
- (B) What is polymer? What is polymerization? List different polymerization mechanism. Explain one mechanism in detail.
- (C) Differentiate between thermoplastic and thermosetting material along with examples.

11

Que:-6

- (A) Discuss the pultrusion process in detail.
- (B) What is MMC, PMC, and CMC and give example of each composite material?
- (C) Explain principle & process of X-ray radiography.

12

END OF PAPER