

GANPAT UNIVERSITY
M. Tech Sem. I (AMT) Mechanical Engineering
Regular CBCS Examination December-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.

SECTION - I

Que:-1

- (A) Classify composite material? Discuss importance of reinforcement in composite material. [03]
- (B) What is Metal Matrix Composite (MMC)? Explain reinforcement and matrix materials of MMCs. Write down properties and applications of MMCs. [04]
- (C) Write short note on: Carbon Nano Tube. [04]

OR

Que:-1

- (A) Discuss the structure, monomer used, properties and application of PET, SAN and PTFE. [04]
- (B) Classify different types of rubbers used in industry and discuss its structure, properties and application of each type. [03]
- (C) Write short note on: Additives for polymers. [04]

Que:-2

- (A) Explain with neat sketch Silicate structure in ceramic materials. [04]
- (B) Define ceramic and explain classification of ceramic materials. [04]
- (C) Enlist different ceramic forming techniques. Explain isostatic pressing process in details. [04]

OR

Que:-2

- (A) Differentiate between thermoplastics and thermosetting material. [04]
- (B) Classify polymerization processes and explain addition polymerization process in detail. [04]
- (C) Explain various types of polymer structures with neat sketch. [04]

Que:-3

- (A) Discuss the Pultrusion process in detail. [04]
- (B) Explain the function of Matrix phase in composite material. [04]
- (C) Write short on Fiberglass-Reinforced composite. [04]

SECTION - II

Que:-4

- (A) What is intergranular corrosion? Explain intergranular corrosion in detail. [04]
- (B) What is Pitting corrosion? Explain the mechanism of the process. [04]
- (C) Define erosion corrosion. Explain effect of turbulence and velocity to erosion corrosion. [04]

OR

Que:-4

- (A) What is dislocation? Explain the role of dislocation in strengthening mechanism. Differentiate between edge and screw dislocation. [04]
- (B) Explain the following terms with respect to dislocation: [04]
i) Burger vector, ii) Dislocation climb
- (C) Explain the process of strain hardening with respect to dislocation theory. [03]

Que:-5

- (A) What is the need of strengthening the materials? Name the different strengthening mechanisms in solid. [04]
- (B) Explain the method of precipitation hardening in detail. [04]
- (C) Explain the mechanism of transformation of austenite to martensite along with important properties of materials containing martensite in microstructure. [03]

OR

Que:-5

- (A) What is metallic bond? Explain metallic bond in brief along with general properties of materials bonded by metallic bond. [04]
- (B) What is meant by imperfection in solid? Explain point defects in solids. [04]
- (C) Differentiate between low angle and high angle grain boundary. [03]

Que:-6

- (A) Explain Griffith theory of brittle fracture. [04]
- (B) Explain stages in development of ductile fracture in detail. [04]
- (C) Differentiate between ductile and brittle fracture. [04]

END OF PAPER