PVP 14

Code: ME3T4

II B.Tech - I Semester – Regular/Supplementary Examinations
November 2019

METALLURGY AND MATERIAL SCIENCE
(MECHANICAL ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks
11x 2 = 22 M

1.

a) List and classify the imperfections in metals.
b) Write any two differences between slip & twinning.
c) Explain the term dendrites.
d) What do you mean by substitutional solid solution?
e) State and explain Gibb's phase rule.
f) What is the difference between low carbon steels and high carbon steels?
g) List some of the aluminium alloys.
h) What are the differences between annealing and normalizing?
i) What is grain refinement?
j) State a few applications of powder metallurgy parts.
k) Define composite.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Explain the terms FATIGUE and CREEP in detail. Compare them. 8 M

   b) Explain the concept of Miller indices and how they are useful in characterization of materials? 8 M

3. Explain the following terms with examples
   i) Eutectic system ii) Eutectoid system
   iii) Peritectic system iv) Peritectoid system 16 M

4. a) Classify steels according to their carbon content and state the applications of each. 8 M

   b) Discuss the classification, applications, merits and demerits of bronzes. 8 M

5. a) Explain and compare carburizing, cyaniding, nitriding with examples. 12 M

   b) Explain Strain hardening with example. 4 M

6. a) Define powder metallurgy and how be the powders are prepared? 8 M

   b) Explain the concept of metal matrix composites. Can ceramics be included in MMCs? 8 M