



M.E DEGREE EXAMINATIONS: JAN 2015

(Regulation 2014)

First Semester.

MECHANICAL ENGINEERING

P14CCT102: Applied Materials Engineering

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Identify the reason for high elastic modulus in materials due to [K₂]
 - a) High strength of bonds
 - b) Weak bonds
 - c) Metallic bonds
 - d) Van der waals bond
2. Select the time dependent permanent deformation from the following [K₂]
 - a) Plastic deformation
 - b) Elastic deformation
 - c) Creep
 - d) Anelastic deformation
3. Match the phenomena listed in Group I with the possible mechanisms in Group II [K₂]

Group I	Group II
A. Fatigue	1. Grain boundary sliding
B. Creep	2. Slip band extrusion and intrusion
C. Strain hardening	3. Cottrell atmosphere
D. Yield point phenomenon	4. Dislocation interaction

 - a) A-2, B-3, C-4, D-1
 - b) A-2, B-4, C-3, D-1
 - c) A-2, B-1, C-4, D-3
 - d) A-1, B-2, C-4, D-3
4. In fracture toughness characterized by K_{IC} , I in the subscript indicates loading by [K₂]
 - a) Crack opening mode
 - b) Forward shear mode
 - c) Parallel shear mode
 - d) Perpendicular mode

15. List the differences between alloy and intermetallic materials? [K₂]
16. List any two properties and applications of dual phase steel. [K₂]
17. What do you meant by work hardening? [K₂]
18. Write a short notes on the effect of free volume in metallic glass [K₂]
19. List the different techniques employed for the manufacture of polymer components. [K₂]
20. Discuss the characteristics and applications of ABS (Acrylonitrile-butadiene-styrene) [K₂]

PART C (6 x 5 = 30 Marks)

21. Explain the mechanism of super plastic behavior. [K₂]
22. Discuss the effect of temperature and applied stress on creep curve. [K₃]
23. Draw and explain the features of deformation mechanism map. [K₂]
24. Explain the various factors considered in the selection of materials for piston and cylinder. [K₂]
25. Explain any two different transparent polymers along with properties and applications [K₃]
26. Explain the properties and applications of Transformation induced plasticity steel (TRIP Steel) [K₂]

PART D (4 x 10 = 40 Marks)

27. Illustrate the features of different strengthening mechanisms in metals and alloys. [K₃]
28. Draw S-N curve and explain the mechanism of fatigue failure. [K₂]

29. Discuss in detail about the selection of materials based on strength and cost aspect. [K₂]

30. List and compare the properties and applications of Al₂O₃ and SiC [K₃]
