

[Total No. of Questions - 8] [Total No. of Printed Pages - 2]  
(2124)

1640

M. Tech 3rd Semester Examination

Materials Technology

PE-E17

Time : 3 Hours

Max. Marks : 100

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** (i) Attempt any five questions.  
(ii) Each question carries equal marks.

1. What is the effect of the rate of deformation on the mechanical properties? How would a difference in grain size affect the change in mechanical properties due to deformation? (20)
2. Write down the short notes on the following points:
  - (a) Concept of crystal geometry.
  - (b) Deformation bands and Kink bands.
  - (c) Strain hardening of single crystal.
  - (d) Lattice defects. (4×5=20)
3. What do you understand by grain boundaries and deformation strengthening from grain boundaries? Write down the phenomenon of strain aging and solid solution hardening. (20)
4. Write down the short notes on the following points:
  - (a) Dislocation sources.
  - (b) Dislocation pile up.
  - (c) Stress fields and energies of dislocations.
  - (d) Interaction of dislocation jogs. (4×5=20)

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5. What are low angle grain boundaries? What do you understand by martensite strengthening, cold worked structure and strain hardening? Explain in detail. (20)
6. Explain the following points in detail:
  - (a) Viscoelastic behavior of polymers.
  - (b) Time dependent mechanical behavior of polymeric materials. (2×10=20)
7. Differentiate between polymorphism and isomerism. Explain the linear and network polymers in detail. (20)
8. What are the fundamentals of metal working? Explain in detail. (20)