

B.TECH. DEGREE EXAMINATION, DECEMBER 2012**Third Semester**

Branch : Mechanical/Automobile Engineering
METALLURGY AND MATERIAL SCIENCE (MU)
(Supplementary/Mercy Chance—Old Scheme)

Time : Three Hours

Maximum : 100 Marks

*Answer all questions.***Part A***Each question carries 4 marks.*

1. Distinguish between Homogeneous and Heterogenous nuclei formation.
2. Define Burgers vector.
3. What do you mean by strain hardening ?
4. State the condition of Bainite formation.
5. Discuss the importance of surface treatment.
6. What is the effect of annealing on microstructure of steels ?
7. List the applications of high speed steels.
8. Sketch and explain the importance of "polymorphic transformation temperature".
9. What do you mean by "crack arrest" ?
10. Briefly discuss the effect of surface texture on fatigue.

(10 × 4 = 40 marks)

Part B*Each full question carries 12 marks.*

11. With neat sketches, explain the various mechanisms of slip and twinning. What are the various dislocation sources ?

Or

12. Discuss :
 - (i) Crystallographic directions.
 - (ii) Atomic packing factor.
 - (iii) Co-ordination number.

(3 × 4 = 12 marks)

Turn over

13. Explain with suitable examples, the difference between cold working and hot working.

Or

14. Explain the iron-carbon diagram with various microstructure changes.

15. Explain (i) Spheroidizing ; (ii) Normalizing ; (iii) austempering ; (iv) Martempering.

Or

16. Discuss any four deposition methods in metals.

17. Explain the classification, composition, properties and applications of cast irons.

Or

18. Explain the composition, microstructure, properties and applications of principal non-ferrous alloys.

19. Define creep. What are creep curves ? With sketches, explain the mechanism of creep formation.

Or

20. With suitable examples, discuss the various factors leading to crack propagation.

(5 × 12 = 60 marks)