

F 3139

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Third Semester

Branch : Automobile Engineering/ Mechanical Engineering/Production Engineering
AU 010 304/ME 010 304/PE 010 304—METALLURGY AND MATERIAL SCIENCE
(AU, ME, PE)

(2010 Admission onwards—New Scheme)

[Regular/Improvement/Supplementary]

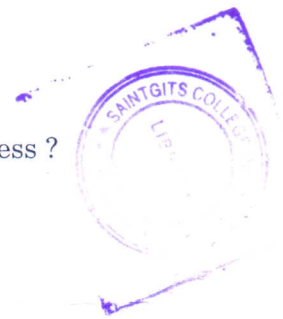
Time : Three Hours

Maximum : 100 Marks

Part A

*Answer all questions.
Each question carries 3 marks.*

1. What is the significance of modulus of elasticity in metal cutting process ?
2. What do you mean by "dendritic growth" ?
3. What are the conditions for martensite formation ?
4. What are the effects of adding Vanadium and Cobalt on steel ?
5. What is the effect of temperature on fatigue ?



(5 × 3 = 15 marks)

Part B

*Answer all questions.
Each question carries 5 marks.*

6. Distinguish between deeper energy well band and shallow energy well band.
7. Define and explain Hall-petch equations.
8. Differentiate between austempering and martempering.
9. Write a note : Applications of cast irons.
10. How will you quantify crack growth and its effect on fatigue ?

(5 × 5 = 25 marks)

Part C

*Answer all questions.
Each full question carries 12 marks.*

11. Draw and explain the BCC, FCC and HCP structures. Determine the atomic packing factor for these structures.

Or

12. Differentiate between primary bands and secondary bands. Classify each and explain their characteristics.
13. Explain the various steps in metallographic specimen preparation. How will you determine microstructure using polishing and etching ?

Or

14. Describe the different mechanisms of diffusion. What are the applications of diffusion in mechanical engineering.
15. What is the need of alloying ? Explain the classification of alloys and solid solutions.

Or

16. Define hardness. Explain hardening process. What are the different hardness and microhardness tests ?
17. Explain the microstructure, properties and applications of any *four* non-ferrous alloys.

Or

18. Discuss : (i) Dislocation movement and ; (ii) Nickel steels.
19. Draw and explain the S-N curve. Explain the mechanism of fatigue failure.

Or

20. Define creep. What are creep curves ? Explain the mechanism of creep deformation.

(5 × 12 = 60 marks)

