Reg. No. : | | | | | | | | | | | |

T 3366

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Fourth Semester

(Regulation 2004)

Mechanical Engineering

MH 1151 — ENGINEERING MATERIALS AND METALLURGY

(Common to Automobile Engineering, Production Engineering)

(Common to B.E. (Part-time) Third Semester Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why carbon solubility is more in austenite?

2. List the advantages of alloy steels as compared to plain carbon steels.

3. What are the principal advantages of austempering over conventional quench and temper method?

4. Mention few applications of induction hardening.

5. How does silicon addition influence the properties of steel?

6. What is carbonitriding?

7. What do you mean by copolymers?

8. How are refractories classified?

9. What are slip bands?

10. What are different types of loadings available for fatigue testing?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the micro constituents of iron? Discuss them briefly. (8)

(ii) How are solid solutions classified? Give two examples for each. (8)

Or

(b) Draw the Fe-Fe_3C equilibrium diagram and discuss the different phases and reactions that take place in it. (16)

12. (a) Draw the T.T.T. diagram for 0.8 percentage carbon steel and describe its isothermal transformations. (16)

Or

(b) (i) The normalized steel is found to be superior to that of annealed steel? Why? Explain. (8)

(ii) What do you understand by the term hardening of steel? Discuss the stages of it. (8)

13. (a) Discuss the characteristics of aluminium and also mention its alloys, their properties and uses. (16)

Or

(b) Discuss the influence of each of the following alloying elements on the properties of steel :

(i) Molybdenum

(ii) Chromium

(iii) Manganese

(iv) Vanadium

(v) Titanium and

(vi) Tungsten. (16)

14. (a) (i) Discuss the properties and applications of ceramic materials in industries. (8)

(ii) Describe the mechanical behaviour of polymers. (8)

Or

(b) With schematic diagrams illustrate the processing of fiber reinforced composites. (16)

15. (a) (i) List the types of fractures and factors influencing them. (6)

(ii) Give the Griffith crack model for the mechanism of fracture. (10)

Or

(b) Write down the procedure for preparing Charpy and Izod specimens for impact testing and also explain how testing is performed. (16)