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

Question Paper Code : 11524

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Fourth Semester

Mechanical Engineering

ME 2253/ME 44/ME 1253/10122 ME 304/080120017 — ENGINEERING MATERIALS AND METALLURGY

(Common to Automobile Engineering)

(Regulation 2008)

(Common to PTME 2253 – Engineering Materials and Metallurgy B.E. (Part-Time) Third Semester – Mechanical Engineering – Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Describe continuous casting of steel.

2. Why is the grain boundary irregular?

3. Define critical cooling rate.

4. List any four principal methods of case hardening.

5. What is the difference between brittle fracture and ductile fracture?

6. What is meant by transition temperature?

7. Explain why copper is a suitable material for automobile radiators.

8. Define the term maraging.

9. List two important characteristics for polymers.

10. What is a hybrid composite?

PART B — (5 × 16 = 80 marks)

11. (a) What is solid solutions? And explain their two types with suitable sketch. (16)

Or

(b) Explain equilibrium cooling of a solid solution alloy and showing the microstructure at various points during solidification. (16)

12. (a) Explain the various steps followed to determine an isothermal – transformation diagram and draw the I.T diagram for eutectoid steel. (16)

Or

(b) Explain the following forms :

(i) Tempering

(ii) Austempering

(iii) Martempering. (16)

13. (a) (i) Explain the mechanism of slip and deformation by twinning. (12)

(ii) Write short notes on polycrystalline material. (4)

Or

(b) Explain the types of impact teats and how ductile to brittle transition is occur with diagram. (16)

14. (a) Explain the following tool properties :

(i) Safety in hardening

(ii) Quenching media

(iii) Toughness

(iv) Heat resistance. (16)

Or

(b) (i) Explain the basic anodizing system with sketch. (8)

(ii) Differentiate anodizing and hard coatings and how dimensional changes is occur in above process with simple sketch. (8)

15. (a) Describe the following terms :

(i) Linear polymer

(ii) Branched polymer

(iii) Chain stiffening

(iv) Cross linked polymer. (16)

Or

(b) What is cemented carbide and how they are made. Explain the step by step process. (16)