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11/15 AN

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Question Paper Code : 21851

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fourth Semester

Mechanical Engineering

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

(Common to Automobile Engineering, Mechanical and Automation Engineering)

(Regulations 2008/2010)

(Common to PTME 2253/10122 ME 304 – Engineering Materials and Metallurgy
for B.E. (Part-Time) Third Semester – Mechanical Engineering –
Regulations 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define binary alloy system.
2. What is age hardening?
3. Why white cast iron are very hard?
4. Define carburizing and its types.
5. What is meant by slip and twinning?
6. Define fracture toughness.
7. Write the purpose of alloying elements added to steel.
8. Write short notes on high speed tool steel.
9. What is the significance of density in polyethylene?
10. Define hot isostatic pressing.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the solid solutions strengthening of a metal by alloying. (16)

Or

- (b) Explain the equilibrium cooling of a Cu-Ni alloy system with phase diagram. (16)
12. (a) (i) What is annealing? And explain its various stages. (12)
- (ii) Differentiate hot working and cold working. (4)

Or

- (b) Explain the following process with neat sketch, Jominy end quench test and flame hardening. (16)
13. (a) Explain the following terms with neat sketch :
- (i) The effect of grain size on dislocation motion
- (ii) Ductile fracture and brittle fracture. (16)

Or

- (b) Describe the following with simple diagram.
- (i) Different types of hardness test
- (ii) Fatigue and creep test. (16)
14. (a) (i) Explain the effect of increasing chromium content in carbon steel. (10)
- (ii) Write short notes on cold work tool steels. (6)

Or

- (b) (i) Explain the most important characteristics and applications of aluminum and its alloys. (12)
- (ii) Write a note on cupronickel. (4)
15. (a) Explain the following polymers with its structures.
- (i) Polyethylene
- (ii) Polypropylene
- (iii) Polybutylene
- (iv) Polyvinyl chloride. (16)

Or

- (b) Explain the mechanical, physical and chemical properties of ceramics. (16)