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Question Paper Code: 31572

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

Fifth Semester

Mechanical Engineering

01UME502 – ENGINEERING MATERIALS AND METALLURGY

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define paratactic reaction.
2. What meant by base metal?
3. What is the use of the isothermal transformation diagram?
4. Name the various method of heat treatment of steel.
5. What are stainless steels?
6. What are HSLA?
7. Define fracture.
8. What is creep fracture?
9. Define the term polymer?
10. What is condensation polymerization?

PART - B (5 x 16 = 80 Marks)

11. (a) What are cooling curves? How does the time-temperature cooling curve of an alloy of eutectic composition differ from that of a pure metal? (16)

Or

(b) How will you plot binary phase diagram for two metals which are completely soluble in liquid and solid states? (16)

12. (a) Explain in detail on annealing, normalizing, austempering and case hardening. (16)

Or

(b) Write short notes on:

(i) Carburizing

(ii) Nitriding

(iii) Cyaniding

(iv) Carbonitriding (16)

13. (a) (i) What are slip and twinning? What are their characteristics? (8)

(ii) Discuss the characteristics of ductile fracture and brittle fracture. (8)

Or

(b) Explain Izod and Charpy test to determine the impact strength of materials? (16)

14. (a) Write an engineering brief about the following steels:

(i) Tool steel (ii) HSLA steel (iii) Martensitic steels (16)

Or

(b) (i) Write the influence of various alloying elements. (8)

(ii) What are the main classifications of stainless steel? (8)

15. (a) Write an engineering brief about the following thermoplastics:

(i) Polyethylene (ii) Polyvinyl chloride

(iii) Acetyl and (iv) Polyamides (16)

Or

(b) List the properties and typical application of the following thermoplastics:

(i) PTFE (ii) PMMA (iii) PET and (iv) PEEK (16)