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

Question Paper Code: 45702

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Fifth Semester

Mechanical Engineering

14UME502 - ENGINEERING MATERIALS AND METALLURGY

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Increase of ferrite phase in steel increases

   (a) Strength (b) Hardness (c) Ductility (d) Brittleness

2. Eutectic reaction for iron carbon system occurs at

   (a) 600^0 C (b) 723^0 C (c) 1147^0 C (d) 1493^0 C

3. Hardness of steel is greatly improved with

   (a) Annealing (b) Cyaniding (c) Normalising (d) Tempering

4. Which one of the following mediums is used for fastest cooling rate of steel quenching

   (a) Air (b) Oil (c) Water (d) Brin

5. The ability of a material to absorb energy in the plastic range is called

   (a) resilience (b) creep (c) fatigue strength (d) toughness

6. Poisson's ratio is

   (a) linear stress/lateral stress (b) Linear strain/lateral strain
   (c) lateral stress/lateral stress (d) lateral strain/linear strain

7. Cast iron is manufactured in

(a) blast furnace (b) cupola
(c) open hearth furnace (d) bessemer converter

8. Aero plane and certain automobile parts are usually made of

(a) Magnalium (b) Aluminium bronze
(c) Duralumin (d) German silver

9. Structure of a polymer is

(a) Long Chain (b) Rhombic
(c) Cubic (d) Closed pack hexagonal

10. Which one of the following materials is not a composite?

(a) Wood (b) Concrete (c) Plywood (d) Sialon

PART - B (5 x 2 = 10 Marks)

11. Differentiate between eutectic and eutectoid.

12. Define Case-hardening.

13. What is meant by Ductility?

14. Define HSLA.

15. What is meant by ABS?

PART - C (5 x 16 = 80 Marks)

16. (a) What is meant Phase? and Differentiate Unary Phase Diagram and Binary Phase Diagram with examples. (16)

Or

(b) Draw and explain various points in iron-carbide equilibrium diagram. List the compositions and typical applications of steels. (16)

17. (a) Explain Annealing, Process annealing, Stress relief and Normalizing in detail. (16)

Or

(b) Briefly explain the Jominy End-Quench Test, Flame Hardening and Carbonitriding. (16)

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

(ii) Write a short note about different types of metallic fractures. Discuss the characteristics of ductile fracture and brittle fracture. (8)

Or

(b) What is meant by Fatigue? How fatigue strength is measured experimentally and Distinguish low and high fatigue cycles. (16)

19. (a) What is an alloy steel? How alloy steels are classified? Explain in detail. (16)

Or

(b) Discuss the composition, properties and typical applications of any four copper alloys. (16)

20. (a) Explain ceramic composite and its any two types of fabrication processes. (16)

Or

(b) (i) Explain the difference between commodity plastics and engineering plastics. (8)

(ii) What do you understand by polymerization? With the help of suitable examples, compare addition and condensation polymerization. (8)