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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2012

MANUFACTURING ENGINEERING

Third Semester

ME9252 Engineering Materials and Metallurgy

(Regulation 2008)

Time : 3 Hours

Answer ALL Questions

Max. Marks 100

PART- A (10 x 2 = 20 Marks)

1. What data can you obtain from a phase diagram?
2. With an example show how the phase rule works?
3. How plain carbon steels are classified?
4. What are the carbon content ranges in plain carbon steels and cast iron?
5. What is the effect of carbon on the position of a TTT diagram?
6. What is the difference between plain Brass and Bronze Composition?
7. What is a Cermet. Give examples?
8. Name any two fibres and two matrices used in composite materials.
9. What is a Burger's Vector?
10. Under what conditions creep strain occurs.

Part – B (5 x 16 = 80 marks)

11. Draw the Iron-Carbon equilibrium diagram and indicate all the reactions, phases, critical temperatures. Discuss the composition and properties of any four phases present in the diagram.
12. a) Discuss the complete procedure for constructing the TTT diagram on eutectoid steel.

OR

- b) Discuss the procedure involved in 3 types of carburizing.

13. a) How are composite materials classified? In each type discuss their composition, properties and applications with 2 examples each.

OR

- b) What are industrial ceramics? Discuss the composition salient features and applications of any four industrial ceramics.

14. a) With examples, composition and application discuss any 3 types of Brass, Bronze and Aluminium alloys.

OR

- b) Discuss the effect of size, testing method, stress concentration, corrosion and surface properties on fatigue.

15. a) (i) Derive the fracture stress equation using the Griffith's theory.
(ii) Discuss the different types of dislocations and state how they affect plastic deformation.

OR

- b) Write short notes on:
- (a) Nanomaterials.
 - (b) Impact Tests.
 - (c) Malleable Cast Iron.
 - (d) Thermosetting plastics.