Register Number: ……..

M.E. DEGREE EXAMINATIONS: APRIL/MAY 2010

Second Semester

CAD/CAM

CCM506: Applied Materials Engineering

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:

PART A (10 x 2 =20 Marks)

1. What is work hardening?
2. Draw the stress strain curves for single crystal and polycrystalline Copper.
3. Define- fracture toughness of a metal.
4. List the major factors that affecting the fatigue strength of a metal.
5. List out the principal characteristics of aircraft structures.
6. What parameters make stiffness as an important parameter in selection of materials?
7. List the applications of shape memory alloys.
8. State the advantages of TRIP steels.
9. What are some properties common to most ceramic materials?
10. State four applications of biopolymers.

PART B (5 x 16 =80 Marks)

11. (a) Discuss the plastic deformation of a single crystal at the atomic level. Also explain the concept of slip, dislocations, twins and their role in plastic deformation of a single crystal.

(OR)

(b) (i) Describe various strengthening mechanisms used for metals. (8)

(ii) Briefly explain superplastic behaviour in metals. (8)

12. (a) (i) Describe the process of fracture of metals and distinguish between ductile and brittle fracture. (12)

(ii) Explain in brief the basic structural changes occur during the fatigue process. (4)

(OR)

(b) (i) Discuss the use of Larsen Miller Parameter in design for determination of time to stress rupture. (4)

(ii) Draw a typical creep curve for a metal under constant load and at a relatively high temperature, and indicate on it all three stages of creep. (12)

13. (a) Write short notes on the following:

(i) Selection of materials for mechanical properties (8)

(ii) Selection of materials for surface durability. (8)

(OR)

(b) (i) Explain in brief the principal characteristics, property requirements and candidate materials for aircraft structures. (8)

(ii) Discuss in brief the materials for automobile structures with respect to, exhaust systems, Corrosion damage and surface treatment. (8)

14. (a) Explain the importance and applications of intermetallics and shape memory alloys.

(OR)

(b) Write short notes on the following:

HSLA Steel and TRIP Steel

15. (a) (i) Describe various industrial polymerization methods. (8)

(ii) Discuss various manufacturing processes used to manufacture thermosetting and thermoplastic components. (8)

(OR)

(b) (i) Describe various processing methods for ceramics. (10)

(ii) Explain the use of Ceramics in biomedical and nanotechnology applications. (6)

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