[4960]-644

M.E.(Mechanical)(CADM&E)
a: MATERIAL FOR ENGINEERING APPLICATIONS
(2012 Pattern)(Elective-I) (Semester-I)(502404)

Time :3Hours] *[Max. Marks : 100*

Instructions to the candidates:
1) Question 1& 7 are compulsory.
2) Answer any two questions from remaining question in each section.
3) Neat diagrams must be drawn wherever necessary.
4) Figures to the right side indicate full marks.
5) Use of calculator is allowed.
6) Assume suitable data if necessary.

SECTION-I

Q1) a) What are the advantages of alloy steel over the plain carbon steel? & Explain line defect with neat sketch. **[10]**

b) Explain the term advanced Material science in Engineering perspective, and also explain types of materials. **[8]**

Q2) a) Explain fundamentals of material like covalent, Ionic, Metallic bond and their strength. **[8]**

b) What are some ceramics materials that are currently being. Used for the cutting tool application & what features or properties make them applicable? **[8]**

Q3) a) Write the short note on Nickel aluminide. **[6]**

b) Distinguish the three different types of fiber reinforced composites on the basis of fiber length and orientation; comment on the distinctive mechanical characteristics for each type. **[10]**

Q4) a) Explain ceramic phase diagram with example. **[8]**

b) How are stainless steels classified? Explain each type in detail with alloying elements added and their role. **[8]**

Q5) a) What are metallic glasses? Why the word glasses are used for these materials? Explain how it is produced? What are the properties and applications? **[10]**

b) "At low temperature the properties of material are surprisingly different from properties exhibited at a atmospheric temperature". Explain.   **[6]**

Q6) a) Write Short note on.   **[10]**

    i)   Bearing Materials

    ii)   Silicate Ceramic

b) Compare Polymer matrix, Ceramic Matrix and Metal Matrix Composites.   **[6]**

SECTION-II

Q7) a) Distinguish the three different types of fiber-reinforced composites on the basis of fiber length and orientation.   **[8]**

b) Explain the "Mechanical Behavior of composites" with reference to 'Young's Modulus's and strength consideration for continuous FRCs and short FRCs.   **[10]**

Q8) a) State properties and applications of refractories.   **[6]**

b) Explain any one method of processing of ceramics. Also state it's applications.   **[10]**

Q9) a) What is Fatigue? Explain Fatigue of Laminated composite.   **[8]**

b) Write the short note on Carbon fibers and Aramid fibers.   **[8]**

*Q10)*a) What is Creep? Explain creep in ceramic?   **[6]**

b) Explain Halpin-Tsai equation and explain the strength of FRC.   **[10]**

*Q11)*a) Give comparative study and application of PMCs, CMCs & MMCs.**[8]**

b) Describe various proceses used to produce a component made of composite materials.   **[8]**

*Q12)*a) Explain the mechanism of load transfer from matrix to fiber.   **[8]**

b) What are Hybrid composites? Give their properties and applications.**[8]**

◀▶ ◀▶ ◀▶