

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
II B.TECH II SEM-REGULAR/SUPPLEMENTARY EXAMINATIONS MAY - 2010
AEROSPACE MATERIALS AND COMPOSITES
(AERONAUTICAL ENGINEERING)

Time: 3hours**Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1. a) Derive the relation-ship for the toughness of a metal whose true stress-strain curve obey the power law $\sigma = k \epsilon^n$.
 b) Distinguish clearly among the following:
 i) Notch toughness
 ii) Notch Brittleness
 iii) Notch sensitivity. [10+6]
2. a) List out the components in Aerospace applications which are made by using aluminum alloys.
 b) Explain the precipitation hardening of Aluminum- Magnesium alloys? [6+10]
3. Discuss the preparation of the following:
 (i) Glass fibers
 (ii) Carbon fibers
 (iii) Kevlar fibers [4+6+6]
4. a) A light weight leaf spring for an automobile can be produced from HM Graphite-epoxy composite. What volume percent of fiber must be present for the spring to have the same modulus as steel, 30×10^6 ?
 b) Determine the specific modulus of a composite containing a Be matrix and 30 Vol% of SiC whiskers. [9+7]
5. a) What are the various failures to be considered in the orientation of the laminates?
 b) How the fiber – direction affects the young's modules and stiffness of the composites? [6+10]
6. a) Why the components are superior in compression molding process compared to other processes?
 b) What is the sequence of operations involved in making components by vacuum bag molding process? [8+8]
7. a) What are the methods used to find the thickness variation of the plates made of composite materials?
 b) What are the advantages of x – ray back scatter imaging used to detect the defects of composites? [8+8]

8. a) What are the advantages of using carbon and graphite fiber as reinforcement in MMC's? Mention their applications in the aircraft?
- b) What are the superior properties of MMC materials for using in aircraft parts?

[10+6]

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