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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2013

MATERIALS SCIENCE AND ENGINEERING BRANCH

VI Semester

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ML9353 COMPOSITE MATERIALS

(R2008)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What are the criteria for the selection of matrix material
2. What does S-glass, E-Glass, C-Glass stand for?
3. Distinguish between delamination and debonding.
4. What are the drawbacks in hand lay up process?
5. What is the role of wetting in bonding?
6. How to control the formation of Al_4C_3 during processing of Al/SiC composite?
7. Weak interface bonding promotes toughness in CMC-True or false Justify your answer
8. Distinguish between fiber pull out and fiber push out
9. Mention few applications of C/C composites.
10. What are the ways the porous structure of C/C composites can be eliminated?

Part – B (5 x 16 = 80 marks)

- 11 (i) List out the matrix and reinforcement materials for PMC , MMC and CMC and also discuss the properties of it (10)
(ii) Explain the strengthening mechanism of fiber reinforced composites (6)
 - 12a (i) With neat diagram explain the following process to prepare PMC (16)
(a) Filament winding, (b)Injection Molding, (c)RRIM
- OR**
- 12b (i) Distinguish between interface and Interphase. Explain the different bonding mechanisms (8)
(ii) Explain the method to predict the bonding strength of the interface (8)
 - 13a (i) Derive and expression for E_{11} and E_{22} for unidirectional fiber reinforced composite and also list out the assumptions for the derivation (10)
(ii) Differentiate isotropic, orthotropic laminate, Quasi-isotropic laminate (6)
- OR**
- 13b (i) What are in-situ composites? How does it differ from ex-situ composites and precipitates? (6)
(ii) Explain the technological challenges associated with the production of Particle reinforced MMC by liquid state processing (10)

- 14a (i) Explain the toughening mechanisms in CMC (6)
(ii) Discuss the processing of CMC by Slurry impregnation process (10)

OR

- 14b (i) Explain the processing of CMC by direct oxidation and chemical vapour technique (16)

- 15a (i) Explain any two technique to process carbon/carbon composites (16)

OR

- 15b (i) Explain the method of carbon fiber production from PAN and PITCH (8)
(ii) Discuss the criteria to use C/C composites as thermal protection system (8)