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B.E/B.Tech (Full-Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2012
MATERIALS SCIENCE AND ENGINEERING BRANCH
SIXTH SEMESTER-REGULATION 2008

ML9353 – COMPOSITE MATERIALS

Time: 3Hr

Max.Mark:100

Answer ALL Questions

Part –A (10x2=20 Marks)

1. What does S-glass, E-Glass, C-Glass stand for and mention its applications?
2. Why nonferrous metals are used as the matrix material for MMC?
3. Distinguish between delamination and debonding.
4. What is the role of wetting in bonding of fiber and matrix?
5. Give your suggestions to minimize Al_4C_3 formation during Al/SiC composite processing.
6. What is the role of wetting in bonding of fiber and matrix?
7. Mention the limitations of ceramics?
8. What does $(\pm 45/0_2)_s$ represent?
9. Distinguish between high strength and high modulus carbon fibers.
10. What are the ways the porous structure of C/C composites can be eliminated?

Part – B (5x16 = 80 Marks)

- 11 (i) Derive an expression for E_{11} and E_{22} for unidirectional fiber reinforced composite (10)
(ii) List out the matrix and reinforcement materials and its properties for PMC, MMC and CMC (6)
- 12a Discuss the following processing methods for PMC (16)
(a) RTM, (b) Hand lay up, (c) RRIM
- OR
- 12b (i) Distinguish between interface and interphase. What are the mechanisms control the interface bonding (8)
(ii) How do you predict the bonding strength of fiber/matrix interface by experimentation? Explain any two methods (8)
- 13a Explain the stir casting technique to fabricate particle reinforced metal matrix composite? What are the technological challenges associated with the process? Suggest suitable methods to overcome the challenges. (16)
- OR
- 13b (i) What are in-situ composites? How does it differ from ex-situ composites and precipitates? (8)
(ii) How do you prepare fiber reinforced MMCs? Illustrate with neat diagram. (8)
- 14a Explain the processing of CMC by direct oxidation and HIP (16)
- OR
- 14b (i) Explain the toughening mechanisms in CMC (6)
(ii) Discuss the processing of CMC by Slurry impregnation process (10)

- 15a** (i) Explain the processing of carbon/carbon composites. (8)
(ii) Explain the method of carbon fiber production from PAN and PITCH (8)

OR

- 15b** (i) What are the properties of carbon fibers and List the properties of carbon/carbon composite. (8)
(ii) Discuss the Applications of C/C composites in aerospace industries (8)