

B.E (FULL TIME) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2012

MATERIALS SCIENCE AND ENGINEERING

FIFTH SEMESTER (R 2008)

ML 9353-COMPOSITE MATERIALS

TIME: 3 Hrs.

Max. Marks: 100

Answer all questions

Part-A (10 x 2 = 20 marks)

1. Name any 2 examples for laminar composites.
2. Define rule of mixtures.
3. Why glass is the most widely used reinforcement in polymer matrix composites?
4. What is filament winding?
5. Define the term 'Aspect ratio'.
6. What is cermet?
7. What is vitrification? When it is used?
8. Mention the role of cobalt in cemented carbides.
9. State any 2 industrial items made out of carbon-graphite.
10. Define the term 'pyrolizing'.

Part – B (5x 16 = 80 marks)

11. (i) How composite materials are classified? (4)
- (ii) What is dispersion-strengthened composite? How it is different from particle reinforced composites? (6)
- (iii) Write brief note on composites for load bearing applications. (6)

12. (a) (i) How is the matrix polymer introduced in thermoplastic composites? (4)
- (ii) What are the three main types of synthetic fibers used to produce fiber reinforced plastic composite materials? (4)
- (b) Discuss the properties and production of above composites (8)

- (OR)
- (b) (i) With a neat illustration, describe the reinforced reaction injection moulding process of producing polymer matrix composites. (10)

(ii) Write brief note on GFRP. (6)

13. (a) (i) Derive the rule of mixtures for the modulus of elasticity of a fiber reinforced composites, when a stress is applied I) along the axis of the fiber and II) perpendicular to the axis of the fiber. (8)

(ii) Discuss the characteristics of fiber reinforced MMCs. (8)

(OR)

(b) Explain the processing of Metal Matrix composites by

(i) Powder metallurgy route (8)

(ii) Stir casting (8)

14. (a) (i) Compare the characteristics of oxide and non-oxide ceramics (8)

(ii) Discuss briefly about the different reinforcements used in Ceramic Matrix Composites. (8)

(OR)

(b) Explain the sintering mechanism and Hot iso-static processing of CMCs.

15. (a) Write short note on the following:

(i) Matrix materials of carbon-carbon composites (8)

(ii) Fibers of carbon-carbon composites. (8)

(OR)

(b) (i) Explain the process chemical vapour deposition of producing carbon-carbon composites (10)

(ii) Composite materials for the nose of a space shuttle. (6)