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Question Paper Code: 49217

M.E. DEGREE EXAMINATION, MAY 2015.

Elective

CAD / CAM

14PCD525 - COMPOSITE MATERIALS AND MECHANICS

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (5 x 1 = 5 Marks)

- Name a suitable fiber material for bullet proof application.
(a) Carbon fiber (b) Glass fiber (c) Kevlar fiber (d) Boron fiber
- What is the material model of a composite material?
(a) Isotropic (b) Anisotropic (c) Orthotropic (d) Quasi-isotropic
- An aircraft composite wing structure has to be analyzed. What is the type of analysis?
(a) Dynamic analysis (b) Static analysis
(c) Quasi-static analysis (d) Thermal analysis
- What is the admissible crack extension mode to form any crack?
(a) Opening mode (b) Forward-Shear mode
(c) Parallel-Shear mode (d) Sum of the three modes
- Suggest a suitable matrix material for the use in elevated temperatures as in case of space applications.
(a) Ceramic (b) Polymer (c) Metal (d) Carbon

PART - B (5 x 3 = 15 Marks)

- What is a Composite? What are its ingredients?
- Write a short note on isotropic, anisotropic and orthotropic materials.

8. How do an angle-ply laminate differs from cross-ply laminate?
9. What do you mean by sandwich composites? Sketch it.
10. List the common ceramic matrix materials used for composites applications.

PART - C (5 x 16 = 80 Marks)

11. (a) (i) List out the various advantages of composite materials. (6)
- (ii) Discuss in detail about the classification of composite material system? (10)

Or

- (b) Explain the various tests for measuring interfacial strength of a composite. (16)
12. (a) Derive an expression for stress-strain relation for a composite material. (16)

Or

- (b) Derive an expression for stress-strain relation for a lamina of arbitrary orientation. (16)
13. (a) Derive an expression for classical lamination theory. (16)

Or

- (b) Give a brief account of interlaminar stresses in cross-Ply laminates. (16)
14. (a) With the aid of neat sketches, explain the basic fracture modes in composite material. (16)

Or

- (b) Write the significance of Sandwich constructions in Composite applications. What are the applications of Sandwich Composites? Mention its properties? (16)
15. (a) Explain Squeeze Casting process in detail for the manufacture of MMCs with the aid of a neat sketch. List out the products that can be fabricated through this process. (16)

Or

- (b) Explain in detail the types of Composite joints with illustrations. (16)