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## Seventh Semester B.E. Degree Examination, Jan./Feb.2021 Nano Composites and their Applications

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. What are nano composites? Discuss the need for composite materials in detail. (08 Marks)  
b. Discuss the classification of composites with examples. (08 Marks)

OR

- 2 a. Write note on particle and fibre reinforced composites. (08 Marks)  
b. How carbon fibers are produced? Explain with example. (08 Marks)

### Module-2

- 3 a. Explain about injection moulding technique used in processing of polymer matrix composites. (08 Marks)  
b. What are symmetric, angle ply and cross ply laminates? Explain. (08 Marks)

OR

- 4 a. Discuss in detail about compression moulding technique used for processing of polymer matrix composites. (08 Marks)  
b. Discuss the applications of polymer matrix composites with examples. (08 Marks)

### Module-3

- 5 a. Discuss the applications of metal matrix nano composites with examples. (08 Marks)  
b. Discuss the effect of reinforcement in metal matrix composites. (08 Marks)

OR

- 6 Write note on following methods used in processing of metal matrix composites:  
a. Powder metallurgy process. (05 Marks)  
b. Diffusion bonding. (05 Marks)  
c. Stir and squeeze casting. (06 Marks)

### Module-4

- 7 a. What are ceramic matrix composites? Discuss the need for ceramic matrix composites in detail. (08 Marks)  
b. Discuss the application of ceramic matrix composites in aerospace and automotive industries with examples. (08 Marks)

OR

- 8 a. What are carbon/carbon composites? Discuss the advantages and limitations of carbon matrix. (08 Marks)  
b. Explain about Hot Pressing, Hot isostatic pressing and Cold isostatic pressing process. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-5**

- 9 a. Discuss the classification of laminates with examples. (08 Marks)
- b. Brief about compression testing of composite materials. (08 Marks)

OR

- 10 Write note on:
  - a. Generalized Hook's law. (05 Marks)
  - b. Quasi isotropic laminates. (05 Marks)
  - c. Orthotropic stiffness matrix. (06 Marks)

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