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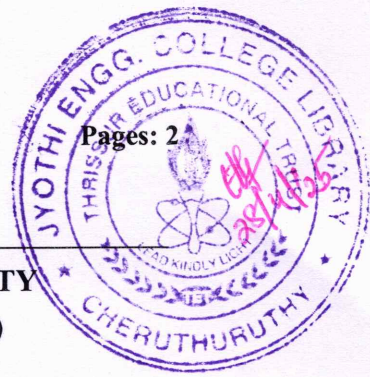
Pages: 2

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S8 (R,S) Exam April 2025 (2019 Scheme)



Course Code: MET416

Course Name: COMPOSITE MATERIALS

Duration: 3 Hours

Max. Marks: 100

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|---|-----|
| 1 | What is the condition for a composite to be called a nanocomposite? | (3) |
| 2 | List one material for the matrix and two materials for reinforcements for a rubber composite. | (3) |
| 3 | When would aramid fibers be used in place of carbon fibers? | (3) |
| 4 | Describe any three disadvantages of natural fibers. | (3) |
| 5 | Why are prepregs so important in polymer matrix composites? | (3) |
| 6 | What are elastomeric polymers? Give two examples. | (3) |
| 7 | Describe some of the advantages of metal matrix composites over monolithic metals. | (3) |
| 8 | What are the typical applications of metal matrix composites in automotive industry? | (3) |
| 9 | Write down any three assumptions used in the micromechanical modelling of composites. | (3) |
| 10 | Write down the main disadvantages of the Lanxide process. | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

- | | | |
|----|--|-----|
| 11 | a) List any two types of smart composites and describe its specialities. | (8) |
| | b) How is contact angle measured? | (6) |

OR

- 12 a) Describe different types of bonding interface present in composites. (14)

Module II

- 13 a) Describe the various types of whiskers with examples. (6)
b) Explain with neat sketch the carbonisation process. (8)

OR

- 14 a) Explain with neat sketch the method of manufacture of glass fibers. (14)

Module III

- 15 a) With a neat sketch explain the filament winding process of polymer matrix composite fabrication. (14)

OR

- 16 a) Describe the function of an autoclave. (6)
b) Explain with neat sketch the spray up process. (8)

Module IV

- 17 a) Which are the major discontinuities at interfaces in metal matrix composites? (8)
b) Compare the advantages of metal matrix composites over polymer matrix composites. (6)

OR

- 18 a) Describe the in situ techniques for metal matrix composite fabrication. (8)
b) Explain the role of intermetallics in metal matrix composites. (6)

Module V

- 19 a) Explain the Maximum stress criteria for composites. (6)
b) Describe the advantages of using sol-gel and polymer pyrolysis techniques to process the ceramic matrix in ceramic matrix composites. (8)

OR

- 20 a) Explain the Tsai-Hill failure criteria for composites. (6)
b) Explain with neat sketch the method of hot pressing for ceramic matrix composites. (8)
