Code No: **R164103D**  **R16**

### IV B.Tech I Semester Supplementary Examinations, February- 2020
## ADVANCED MATERIALS
### (Mechanical Engineering)

**Time: 3 hours**                                                    **Max. Marks: 70**

*Question paper consists of Part-A and Part-B*
*Answer ALL sub questions from Part-A*
*Answer any FOUR questions from Part-B*
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## PART–A *(14 Marks)*

1. a) What is fiber reinforced composite?                                                [2]
   b) Compare the properties of various reinforcements used in polymer composites.       [3]
   c) Give the applications of open mold FRP Process.                                    [2]
   d) Give the expression for compliance and stiffness matrix.                           [3]
   e) Explain shape memory effect.                                                       [2]
   f) What kinds of bulk materials exist?                                                [2]

## PART–B *(4x14 = 56 Marks)*

2. a) What is a Matrix? What are the various types of matrices used in the composite
      material? Explain the advantages and disadvantages and applications of each one
      of them.                                                                           [7]
   b) Write the specific characteristics of Kevlar and Silicon Carbide.                  [7]

3. a) Discuss any one manufacturing method of Polymer matrix composite.                  [7]
   b) Give a brief note on Carbon Fiber-Reinforced Polymer (CFRP) Composites.            [7]

4. a) List out the manufacturing methods of metal matrix composite and explain any
      one of them with a neat sketch.                                                    [7]
   b) Explain Resin transfer molding process with a neat sketch.                         [7]

5. a) Derive the compliance matrix of an orthotropic lamina.                             [7]
   b) List out the assumptions made in classical lamination theory.                      [7]

6. a) Briefly give a note on the types of functionally graded materials.                 [7]
   b) What do you mean by smart materials? Briefly explain shape memory alloys.          [7]

7. a) Enumerate the applications of nano materials.                                      [7]
   b) Briefly discuss the advances in Nano materials.                                    [7]

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