CBCS SCHEME

USN | | | | | | | | | |

15MA754

Seventh Semester B.E. Degree Examination, June/July 2019
Smart Materials

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 Explain the shape memory effect with step-by-step description and represent it in stress temperature diagram. **(16 Marks)**

OR

2 List and explain any four major issues that should be addressed before designing an application using shape memory alloys. **(16 Marks)**

Module-2

3 a. With a neat diagram, explain the behaviour of ER materials under the influence of an electric field. **(08 Marks)**

b. Explain in detail any two applications of ER fluids. **(08 Marks)**

OR

4 a. Explain MR effect and write the Bingham plastic model used to model MR device. **(08 Marks)**

b. List any four commercial applications of MR fluids. **(08 Marks)**

Module-3

5 Draw a schematic diagram for vibrational control of a smart structure that features a piezoactuator and a sensor. Explain its individual components. **(16 Marks)**

OR

6 Discuss the following in the context of biomimetics:
i) Antireflective coatings ii) Infrared sensing. **(16 Marks)**

Module-4

7 Explain with a neat sketch any two microfabrication techniques for MEMS. **(16 Marks)**

OR

8 Explain with a neat sketch the concept with principles of magnetic actuation. **(16 Marks)**

Module-5

9 Discuss the following with suitable examples:
i) Microfluidic devices ii) Polymers in MEMS. **(16 Marks)**

OR

10 Discuss the following with appropriate case studies:
i) Microphone ii) Acceleration sensors. **(16 Marks)**

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