CBCS SCHEME

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15ME745

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019
Smart Materials and MEMS

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Explain in brief closed and open loop smart structures. **(08 Marks)**
b. Explain in brief processing and characteristic of shape memory alloys. **(08 Marks)**

OR

2 a. Mention the different types of smart materials and their applications. **(06 Marks)**
b. What are shape memory alloys? With neat sketch explain the influence of stress associated with characteristic temperature of shape memory alloys. **(10 Marks)**

Module-2

3 a. Write a note on Magneto Rheological fluids. **(08 Marks)**
b. Explain the application of MR fluids in the clutches used to transfer torque between rotating mechanical components. **(08 Marks)**

OR

4 a. With neat sketches, explain the physical phenomenon and characteristics of fiber optics. **(08 Marks)**
b. With neat sketches, explain the twisted and braided fiber optic sensors. **(08 Marks)**

Module-3

5 a. Explain the analysis of parallel damped vibration. **(08 Marks)**
b. Explain the concept of structures as control plants. **(08 Marks)**

OR

6 a. Mention the characteristics of Natural structures and Natural creamers. **(08 Marks)**
b. What are the challenges and opportunities in biomimetics? **(08 Marks)**

Module-4

7 a. With neat sketches explain atleast two types of thin film deposition techniques. **(08 Marks)**
b. With neat sketch explain photolithography. **(08 Marks)**

OR

8 a. With neat sketch explain cantilever, piezoelectric based MEMS device. **(08 Marks)**
b. With neat sketch explain sensors and actuators. **(08 Marks)**

Module-5

9 a. Briefly explain polymers in MEMS. **(10 Marks)**
b. What is polymer MEMS? List out their applications. **(06 Marks)**

OR

10 Write short note on the following:
a. Microphone b. MEMS Magnetic actuators
c. BP sensors d. Acceleration sensors **(16 Marks)**

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