CBCS SCHEME

USN | | | | | | | | | |

17ME745

Seventh Semester B.E. Degree Examination, July/August 2021
Smart Materials and MEMS

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions.***

1 a. Briefly explain with block diagram of key elements of Smart Materials. **(10 Marks)**
b. Explain the applications of Smart Materials. **(10 Marks)**

2 a. Define Smart Structure , Sensors and Actuators **(10 Marks)**
b. What are the potential feasibility in Smart Structure? **(10 Marks)**

3 a. What is the basic principle governing the operation of fiber optics? **(10 Marks)**
b. Explain strain rate effect in Piezoelectric materials. **(10 Marks)**

4 a. What are the properties of MR/ER fluids? **(10 Marks)**
b. Explain the Bingham plastic model of pre – yield response and post yield response geometry. **(10 Marks)**

5 a. Derive the Frahm absorber in undamped spring – mass system with figure **(10 Marks)**
b. Explain the strategies and limitations of control structure. **(10 Marks)**

6 a. Describe the Bio-metric sensing. **(10 Marks)**
b. Explain the structural design of wood as fiber – reinforced matrix. **(10 Marks)**

7 a. Explain with figure Photolithography. **(10 Marks)**
b. Explain the Microelectronics fabrication flow chart. **(10 Marks)**

8 a. List the properties of Piezoelectric materials , Quartz , Lithium Niobate , Barium titanate , Lead titanate ceramic. **(10 Marks)**
b. What are advantages of Magnetic actuators and principles of Magnetic actuation? **(10 Marks)**

9 a. What are applications of polymers in MEMS? **(10 Marks)**
b. Write the applications of PDMS and PMMA. **(10 Marks)**

10 a. Briefly explain the Acceleration sensors Accelerometers. **(10 Marks)**
b. What is Blood pressure? Mention the types and how does a blood pressure sensor work. **(10 Marks)**

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