



CBCS SCHEME

15ME745

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
Smart Material 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 piezoelectric properties. (06 Marks)
b. Derive an equation for actuation of structural components by piezoelectric crystals under Axial motion of Rods considering various loading. (10 Marks)

OR

- 2 a. Explain experimental phenomenology of SMA. (06 Marks)
b. Discuss elaborately vibration control through SMA. (10 Marks)

Module-2

- 3 a. Explain Fluid composition and behavior. (06 Marks)
b. Discuss the application of ER and MR Fluids on two basic types of devices. (10 Marks)

OR

- 4 a. Explain Total Internal Reflection phenomenon. (06 Marks)
b. Write a note on fibre optics strain measurement. (05 Marks)
c. Discuss additional applications of Fiber optics. (05 Marks)

Module-3

- 5 a. Derive an equation of governing condition motion and Amplitude of the main mass to be independent of the damping ratio for parallel Damped vibration absorber. (12 Marks)
b. Discuss perissogyro vibration absorber with neat sketch. (04 Marks)

OR

- 6 a. Explain Fibre – Reinforced organic matrix Natural composites. (08 Marks)
b. Discuss Biomimetic sensing. (08 Marks)

Module-4

- 7 a. Explain thin film deposition techniques. (08 Marks)
b. Explain photolithography. (08 Marks)

OR

- 8 a. Explain cantilever piezoelectric actuator model. (08 Marks)
b. Discuss the concept and principles of magnetic actuation. (08 Marks)

Module-5

- 9 a. Discuss polymers in MEMS. (08 Marks)
b. Elaborate the applications of polymers MEMS. (08 Marks)

OR

- 10 a. Discuss the case studies on BP sensors. (10 Marks)
b. Explain MEMS product development in view of Reliability, Cost, Performance. (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.