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10AE764

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

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART - A

- 1 a. What are Composite Materials? How composite materials are classified? Mention the important characteristics of composite materials. (10 Marks)
b. What is Shape Memory phenomenon? Explain with neat sketch. Also explain one way, two way shape memory effect with neat sketch mentioning its applications. (10 Marks)
- 2 a. What are Sensors? Describe the type of sensors and its applications. (10 Marks)
b. Write a short note on :
i) Chemical sensor ii) Mechanical sensor. (10 Marks)
- 3 a. What do you mean by Magneto Rheological fluids? Explain the working principle of MR fluids with suitable sketch. (04 Marks)
b. Briefly explain the modes of operation of MR fluids with suitable sketch. Mention the application of each mode of operation. (08 Marks)
c. With a neat sketch, explain the working of MR fluid damper. (08 Marks)
- 4 a. Explain the working principle of optic fibre with suitable neat sketch and write on its advantages , applications. (10 Marks)
b. Write short notes on :
i) Numerical aperture.
ii) Working principle of crack detection system using optical fibre in smart structure. (10 Marks)

PART - B

- 5 a. Explain the design principle of active skin based actuation structure using SMA piezoelectric materials. (10 Marks)
b. Explain the application of smart structure in aerospace and transportation vehicles.(10 Marks)
- 6 a. Explain the vibration control principles using shape memory alloys (SMA). (10 Marks)
b. Explain Distributed control system (DCS) and describe advantages application. (10 Marks)
- 7 a. Explain basic process of MEMS using suitable flow chart. (10 Marks)
b. Explain PZT actuators. Write its characteristics and applications. (10 Marks)
- 8 a. What is Neural Network? Briefly explain and discuss what are its advantages, applications. (10 Marks)
b. Write short notes on :
i) Data visualization ii) Data processing. (10 Marks)

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.