

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10MT63

**Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019**  
**Micro and Smart System Technology**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.**

**PART – A**

- 1 a. List the difference between Microsystems and Microelectronics. (05 Marks)
- b. Mention the technical reasons for miniaturization. (05 Marks)
- c. With neat block diagram explain typical smart system and compare each component with respect to biological system. (10 Marks)
- 2 a. Describe working of silicon capacitive accelerometer. (08 Marks)
- b. Briefly explain operation of portable blood analyzer. (06 Marks)
- c. With neat schematic explain material used and principle of operation of comb-drive. (06 Marks)
- 3 a. Explain Evaporation and sputtering processes in thin film deposition. (10 Marks)
- b. With the help of neat schematic explain the process steps involved in realizing cantilever structure by surface micromachining. (10 Marks)
- 4 a. Explain the concept of coupled electro mechanics in details. (10 Marks)
- b. Discuss the effect of residual stresses and stress gradients. (10 Marks)

**PART – B**

- 5 a. Using Finite Element method analyze a Rod element and beam element shape functions. (10 Marks)
- b. What is Finite Element method? Explain its procedure using flow chart. (10 Marks)
- 6 a. Explain the operation of switched capacitor circuit for capacitance measurement. (10 Marks)
- b. With necessary mathematical equations, explain, state-space modeling. (10 Marks)
- 7 a. Discuss the special issues in microsystem packaging with packaging parameter. (10 Marks)
- b. Describe with neat diagram wire bonding and flip chip assembly packaging technologies. (10 Marks)
- 8 Write a short note on the following:
  - a. Lithography-photolithography
  - b. Thin film deposition
  - c. Pressure sensor
  - d. Active vibration control of a beam. (20 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.