

CBCS SCHEME

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18EE732

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Micro and Nano Scale Sensors and Transducers

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Briefly explain capacities pressure sensors and its structure. (08 Marks)
- b. With a neat graph explain the experimental result of total pressure acting on the capacitive pressure sensors. (08 Marks)
- c. Comparison between capacities and piezo-resistive sensors. (04 Marks)

OR

- 2 a. With a block diagram explain interface circuit used to measure the inductance. (08 Marks)
- b. Explain the theory behind the ultrahigh sensitivity pressure sensors. (10 Marks)
- c. Write a short note on Inductive Pressure Sensors. (02 Marks)

Module-2

- 3 a. With a neat sketch explain the principle of operation of the new acceleration sensor. (08 Marks)
- b. Explain in detail the experimental results of physical parameters of the sensor in dynamic range. (06 Marks)
- c. Explain the measurement of the capacitance constant 'k' as a function of acceleration. (06 Marks)

OR

- 4 a. Discuss the structure of CO gas sensor and write its characteristic advantages. (06 Marks)
- b. With an expression describe the theory CO gas sensor based nanotechnology. (08 Marks)
- c. With a neat sketch explain the principle of operation of smoke detectors. (06 Marks)

Module-3

- 5 a. Explain the theory of moisture sensors with expression. (08 Marks)
- b. With a neat graph explain auxiliary experimental results of moisture sensors. (08 Marks)
- c. Write short note on moisture sensors. (04 Marks)

OR

- 6 a. Briefly explain the principle of operation of optoelectronic microphone. (08 Marks)
- b. Explain briefly optoelectronic and photonic microsensors. (08 Marks)
- c. Comparison of new microphone with interferometry based microphone and light intensity based microphones. (04 Marks)

Module-4

- 7 a. With a neat flow chart explain the general structure of lab on a chip sensors. (08 Marks)
- b. Explain the theory on Bending radius of the generated free electrons of magnetic field sensors. (08 Marks)
- c. List the disadvantage of magnetic field sensor. (04 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.

OR

- 8 a. Briefly explain the introduction and fundamental principle of magnetic sensor. (10 Marks)
b. Derive the electrons path in the horizontal direction of magnetic field sensor. (10 Marks)

Module-5

- 9 a. Determine the turn ON conduction of the MOSFET with the expression. (10 Marks)
b. Explain the principle of operation of the α - particle icing detector and present prototype with a neat circuit diagram. (10 Marks)

OR

- 10 a. Explain the experimental results of testing with dry air, lost particles, large condensed water droplets and small crystals of ice. (10 Marks)
b. Explain the load line and the operating points of the MOSFET. (06 Marks)
c. Write short note on Aircraft icing detectors. (04 Marks)

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