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21EE742

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
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. Explain the theory of capacitive pressure sensors.   **(10 Marks)**
   b. Explain the structure of inductive pressure sensors.   **(10 Marks)**

OR

2 a. Explain the block diagram of the interface circuit used to measure the inductance L.
                                                                             (10 Marks)
   b. Explain about ultrahigh sensitivity pressure sensors with neat diagram. **(10 Marks)**

Module-2
3 a. Explain the principle of operation of new acceleration sensor with neat diagram. **(10 Marks)**
   b. Explain the theory of CO gas sensors.   **(10 Marks)**

OR

4 a. Explain with neat block diagram the interface circuit used for measuring the capacitance C of the sensor in real time.   **(10 Marks)**
   b. Explain the principle of operation of new smoke detector.   **(10 Marks)**

Module-3
5 a. Explain the theory of moisture sensors.   **(10 Marks)**
   b. Explain the principle of operation of the advanced optical microphone. **(10 Marks)**

OR

6 a. Explain the structure of moisture sensor with neat diagram.   **(10 Marks)**
   b. Explain the flow chart of the code used in conjunction with the image processing board.
                                                                             (10 Marks)

Module-4
7 a. Explain "Lab on a chip" with neat block diagram.   **(10 Marks)**
   b. Explain the theory on bending radius of the generated free electrons of magnetic field sensors.   **(10 Marks)**

OR

8 a. Explain the principle of operation of magnetic field sensor.   **(10 Marks)**
   b. Explain the deviation of the electron's path in the horizontal direction. **(10 Marks)**

Module-5
9 a. Explain the principle of operation of the α – particle icing detector. **(10 Marks)**
   b. Explain the experimental results of testing with dry air, small crystals of ice, dust particles and condensed water droplets.   **(10 Marks)**

OR

10 a. Explain the theory of operation of the aircraft using detector.   **(10 Marks)**
    b. Explain aircraft icing detector with neat circuit diagram of the present prototype. **(10 Marks)**

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