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B. M. S. College of Engineering, Bengaluru - 560019

Autonomous Institute Affiliated to VTU

May 2023 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Electronics and Communication Engineering **Duration: 3 hrs.**
Course Code: 19EC3DCMSA **Max Marks: 100**
Course: Modern Sensors and its Applications **Date: 12.05.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1. a) Illustrate the role of calibration of the sensors and examine how calibration is performed with relevant expression. **08**

   b) Explain dynamic characteristics with relevant responses as applied to any sensor. **12**

UNIT - II

2. a) Explain piezoelectric principle with relevant properties. Illustrate how the thermal poling method gives a crystalline material to piezoelectric properties. Discuss some unique properties of piezoelectric films. **10**

   b) Explain working principle of a Pyro electric Sensor. Indicate the response of a Pyro electric Sensor to a thermal step function and explain why the magnitude of charge Q_o and voltage V_o does not drop to zero completely. **10**

UNIT - III

3. a) What is tactile sensor? Explain the working principle of active piezoelectric tactile sensor **10**

   b) Analyze a suitable Sensing Mechanism used to detect magnetic fields, position and displacement of objects. **10**

OR

4. a) Illustrate the working principle of Photo Transistor as Light detector. Justify the statement, "Efficiency of a detector depends on its surface area or the area of the focusing system in a phototransistor". **10**

   b) Explain the working of Fiber-optic microphones used as Acoustic sensors **10**

UNIT - IV

5. a) Illustrate a concept of adding up voltages from a thermopile and a thermistor (reference sensor) to obtain a combined output signal. **10**

   b) Describe the working principle of semiconductor-PN junction sensors. **10**

OR

6. a) With the help of the spectral responses of the excitation and emission signals explain the working of Interferometric sensors. **10**

   b) Explain the working principle of RTD. Describe any two computational models of NTC thermistors. **10**

UNIT - V

7. a) With neat schematic explain the positive and negative Photolithography processes used in microelectronics. **10**

   b) Write short note on following deposition methods for growth of thin and thick films **10**

      i) Dry Etching
      ii) Deposition of a thin metal in Vacuum Chamber

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