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Total No. of Questions : 8

M.Tech. (Emb Sys) (2018 Batch) (Sem.–2)
ADVANCED SENSORS AND ACTUATOR
Subject Code : MTES-PE4C-18
M.Code : 76216

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWELVE marks.**

1. a) Differentiate between the following by considering suitable examples

   i) Accuracy and precision

   ii) Repeatability and reproducibility

   iii) Resolution and sensitivity

   b) Explain the following terms :

   i) Calibration

   ii) Traceability

   iii) Range

   iv) Safety

2. Discuss the principles, construction and working of strain gauges. Derive the relation between gauge factor and Poisson's ratio in a strain gauge. Also, explain the important properties of the bonding materials and how are they realized in practice.

3. What are the different deviations that need to be compensated in the sensor systems? Also, explain how these can be taken care of in the present day smart sensor.

4. Explain pneumatic, hydraulic and electrical actuation systems in detail.

5. Explain the following :

   a) Soft and Intelligent sensors

   b) Virtual instrumentation

6. a) Describe three types of oxygen sensors used in automobiles (on board) comparing their advantages and operations with the help of V-I characteristics.

   b) Describe the technique of computation of air speed on air craft by measuring the static pressure, total pressure and temperature. How far is this computation valid? Explain.

7. Explain :

   a) Capacitive sensors

   b) Photoelectric detectors

8. Discuss :

   a) Stepper motors

   b) Servo and proportional control valves

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.