CBCS SCHEME

15EE662

USN ☐☐☐☐☐☐☐☐☐☐

Sixth Semester B.E. Degree Examination, Aug./Sept.2020
Sensors and Transducers

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Define Sensor and Transducers. Classify and explain the transducers based on type of output and electrical principle involved. **(06 Marks)**

 b. List the types of strain gauges. Derive the expression for Gauge-factor. **(06 Marks)**

 c. A linear resistance potentiometer 50mm long and is uniformly wound wire having a resistance of 10000 Ω. Under normal conditions the slider is at the center of the potentiometer. Find the linear displacement when the resistance of the potentiometer as measured by Wheatstone bridge for two cases in (i) 3850 Ω (ii) 7560 Ω. **(04 Marks)**

OR

2 a. With neat diagrams explain the principles of variable area and variable distance type capacitive transducers. **(06 Marks)**

 b. A 2.5 mm thick quartz piezoelectric crystal having a voltage intensity of 0.055 Vm/N is subjected to a pressure of 1.4 MN/m^2. If the permissivity of the quartz is 40.6×10^{-12} F/m, calculate
 (i) Voltage output
 (ii) Charge sensitivity of the crystal. **(04 Marks)**

 c. What is Hall effect? With neat diagram explain the principle of Hall effect transducer. **(06 Marks)**

Module-2

3 a. With neat diagram explain synchros and resolvers. List the advantages of synchros and revolvers. **(05 Marks)**

 b. With neat diagram explain the construction and working of load-cell with necessary equation. **(06 Marks)**

 c. Define the principle of fiber optic transducer with neat diagram explain Intrinsic type of fiber optic transducer with an example. **(05 Marks)**

OR

4 a. With neat diagrams explain the different types of frequency domain transducers. **(06 Marks)**

 b. With general block diagram explain micro electromechanical systems. List its advantages and applications. **(06 Marks)**

 c. Write a note on light sensors. **(04 Marks)**

Module-3

5 a. With neat block diagrams explain D.C. signal conditioning and A.C. signal conditioning. List the functions of signal conditioning equipment. **(08 Marks)**

 b. With neat block diagrams explain single and multichannel data acquisition system. **(08 Marks)**

OR

6 a. List the desirable characteristics of electronic amplifiers. Derive voltage and current gain of electronic amplifier. **(08 Marks)**
   b. What are the applications of data acquisition systems? With neat diagram explain successive approximation A/D converter. **(08 Marks)**

Module-4

7 a. Define Telemetry. With neat diagrams explain voltage Telemetering and current Telemetering system. **(08 Marks)**
   b. With neat diagrams explain Bridgman gauge and Pirani Vaccum gauge. **(08 Marks)**

OR

8 a. What is the need of Modulation? With necessary diagrams explain amplitude and frequency modulation. **(08 Marks)**
   b. Define Data transmission. With necessary diagrams, explain different types of data transmission methods. **(08 Marks)**

Module-5

9 a. Classify the types of thermometers with neat diagram. Explain Resistance Temperature Detector (RTD). **(08 Marks)**
   b. With neat diagrams, explain Piezoelectric and Seismic accelerometers to measure acceleration. **(08 Marks)**

OR

10 a. List the categories of liquid level measurement. With neat diagrams, explain capacitive type and ultrasonic type liquid level gauge. **(08 Marks)**
   b. With neat diagram of Hot wire bridge circuit, explain hot wire anemometers with two different modes. **(08 Marks)**

* * * * *