CBCS SCHEME

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15EE662

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
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. Explain the classification of transducers based on the power requirement, type of output and electrical principles involved. **(09 Marks)**

b. Briefly explain the operation of linear and angular motion potentiometer with neat diagrams. **(07 Marks)**

OR

2 a. A platinum resistance thermometer (RTD) has a resistance of 100Ω at 25°C. The resistance temperature coefficient of platinum is 0.00392Ω/Ω°C.

i) Find its resistance at 50°C

ii) If the thermometer has a resistance of 200Ω, calculate the value of temperature. **(07 Marks)**

b. With neat diagrams, explain the working of capacitive transducers based on :

i) Change in area of the plates

ii) Change is distance between the plates. **(09 Marks)**

Module-2

3 a. Derive the gauge factor for a single uniform length of a conductor (wire) shown in Fig Q3(a)

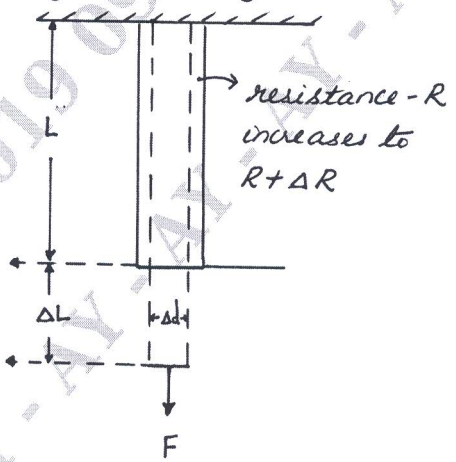

Fig Q4 **(10 Marks)**

b. With a supporting diagram, explain the operation of a pneumatic proximity sensor. **(06 Marks)**

OR

4 Obtain the mathematical expressions for the output voltage of strain gauges using wheat stone bridge for ;

a. Quarter bridge
b. Half bridge
c. Full bridge configurations shown in Fig Q4. **(16 Marks)**

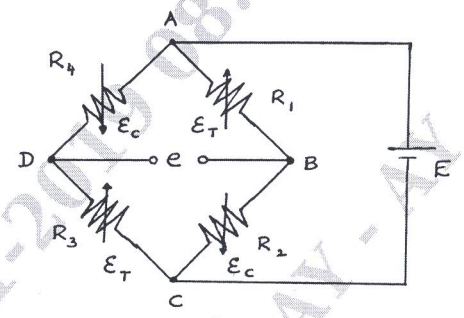

Fig Q4

Module-3

5 a. Describe a general measurement system with a neat block diagram and hence explain signal conditioning and its necessity. **(08 Marks)**

b. With a neat circuit diagram, explain the operation of weighted resistor digital – to – analog converter. **(08 Marks)**

OR

6 a. Describe a general data acquisition system with a neat block diagram. **(08 Marks)**

b. With a neat circuit diagram, explain the operation of successive approximation analog – to – digital converter. **(08 Marks)**

Module-4

7 a. Explain the construction and working operation of a voltage telemetering system with supporting diagram. **(08 Marks)**

b. With a neat diagram, explain the operation of a Pirani gauge **(08 Marks)**

OR

8 a. Explain the construction and working operation of a current telemetering system with the aid of a supporting diagram. **(08 Marks)**

b. With a neat diagram, explain the working of an ionization gauge. **(08 Marks)**

Module-5

9 a. Describe the measurement of shaft power using Eddy current dynamometer with a neat diagram. **(08 Marks)**

b. Explain the theory operation of electromagnetic flow meters with suitable diagram. **(08 Marks)**

OR

10 a. With a neat diagram, explain the measurement of small displacement using LVDT. **(08 Marks)**

b. Explain the theory of operation of level measurement using LASER with a neat diagram. **(08 Marks)**