Total No. of printed pages = 6

END SEMESTER EXAMINATION – 2019

Semester – 5th

Subject Code : Et-507

ELECTRONICS INSTRUMENTATION

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. Questions on PART–A are compulsory.
2. Answer any *five* questions from PART–B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

   (a) The resistance of the metal ___ with temperature.

   (b) Measurements involves the use of instrument as a physical means of determining ___.

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(c) ___ is the instrument which gives the magnitude of the quantity under measurement in terms of physical constant of instruments.

(d) In a Deflection type instrument, the value of measured quantity depends upon the ___ of the instrument.

(e) The accuracy of deflection type instrument is ___ than that of the Null type instrument.

(f) Transducer should have ___ impedance.

(g) The quantity under measurement makes its first contact with the ___ sensing element.

(h) Thermistors are fabricated from the ___ materials.

(i) Turbine flow meters are ___ flow meters.

(j) In inductive Transducer, the output voltage of the coil is proportional to the ___ of eddy current.

2. Write true or false : 1×10=10

(a) In control of processes and operation the output variable to be controlled is non-electrical.

(b) Null type instrument is more sensitive than deflection type instrument.

(c) For dynamic measurement null type instrument is more suitable than deflection type instrument.

(d) Primary sensing element is one of the main functional elements of a measuring system.

(e) Wire-wound potentiometer may be used as a transducer for converting mechanical displacement to an electrical output.

(f) In self-generating types inductive transducer current signal is generated in transducer.

(g) In non-self-generating type inductive transducer no external source is required.

(h) In LVDT type transducer soft iron core provides magnetic coupling between primary and secondary coils.

(i) Barium Titanate may be used as a Piezo-electric transducer.

(j) A photo conductive material changes its resistance due to a change in the intensity of the incident light.

3. Choose the correct answer : 1×5=5

(a) In photo voltaic transducer, voltage output is generated due to

(i) vibrations

(ii) linear velocity

(iii) angular velocity

(iv) incident of light

(b) The measurement of pressure can be done by converting the pressure into

(i) velocity

(ii) acceleration

(iii) temperature

(iv) displacement

(c) The operation of Pirani gauge depends on variation of the

(i) Thermal conductivity with velocity

(ii) Thermal conductivity with pressure

(iii) Thermal conductivity with temperature

(iv) None of the above

(d) Moving coil type transducer for velocity measurement where voltage generated in the coil is proportional to the

(i) temperature (ii) velocity

(iii) displacement (iv) pressure

(e) Seismic accelerometer is used for measuring

(i) pressure (ii) acceleration

(iii) velocity (iv) None of these.

PART – B

Marks – 45

4. Describe the measurement technique of a deflection type instrument (PMMC type) and null type instrument (DC potentiometer type). 4+5=9

5. (a) What are the desirable characteristics of a transducer for its selection for a particular application ? 5

(b) What are the main factors for the selection of motion transducer ? 4

6. (a) Describe the measurement method for measuring motion using variable inductance transducer. 4

(b) What is LVDT transducer ? How it can be used for the measurement of linear and rotational motion of an object. 1+4=5

7. (a) What do you mean by capacitive type transducer ? Point out the main differences between Capacitive type transducer and Piezo- electric transducer. 1+4=5

(b) Explain Photo-emissive transducer in details. 4

8. What are the different types of Opto-electric transducer ? Discuss each of them. 9

9. Describe the low pressure measurement method using Pirani gauge and Ionization type vacuum gauge. 5+4=9

10. With the help of necessary sketch, explain the operation principle of Drag Cup Rotor AC tachometer and also write the advantages and disadvantages of it. 9

11. (a) Explain Photoelectric tachometer in details with its diagram. 4

(b) Describe Piezo-electric type accelerometer along with its features. 5