Total No. of printed pages = 5

Et-507/EI/5th Sem(B)/2018/M

ELECTRONICS INSTRUMENTATION

Full Marks – 70

Time – Three hours

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

GROUP–A

Marks – 25

1. Write true or false : 1×25=25

   (a) Rayleigh current balance is a secondary instrument.

   (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.

[Turn over

(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.

(g) 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) Pirani gauge is used to measure the pressure of 10^{-8} mm of Hg.

(k) Moving magnet type transducer is useful for measurement of vibrations.

(l) Electromagnetic tachometer generators are used for angular velocity measurement.

(m) In AC tachometer generator the magnet is fixed.

(n) Stroboscope is a portable manually operated device.

(o) Seismic accelerometer is used for the measurement of acceleration.

(p) Piezo electric accelerometers are useful for low frequency.

(q) The resistance of the metal increases with temperature.

(r) The temperature coefficient of resistance is positive for a thermistor.

(s) Thermistors are fabricated from metals.

(t) Temperature measurement using thermo-electric sensor is discovered bt Peltier.

(u) Radiation pyrometer is a non-contact type temperature mesurement instrument.

(v) Optical pyrometer is not suitable for measurement of temperature of molten metals.

(w) The conductivity of the liquid should be higher than $10\,\mu\Omega/m$ for the measurement of velocity of a liquid using elctromagnetic flowmeter.

(x) Indicating function is a function of instruments and measuring system.

(y) Characteristics of the transducer should alter the event to be measured.

GROUP – B

Marks – 45

Answer any *three* questions. 15×3=45

2. Describe the measurement technique of a deflection type instrument (PMMC type) and null type instrument (DC potentiometer type). 8+7=15

3. (a) What do you mean by transducer ? What are the desirable characteristics of a transducer for its selection for a particular application ?

   (b) Describe the method for the measurement of motion of an object using potentiometric reistance type transducer. (3+5)+7=15

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

   (b) What is LVDT tranducer ? How it can be used for the measurement of linear and rotational motion of an object ? 7+8=15

5. (a) Discuss how a capacitor type transducer measures the translational and rotational motion.

(b) A capacitor transducer consists of two plates of diameter 2 cm each, separated by an air gap of 0.25 mm. Find the displacement sensitivity. 8+7=15

6. Describe the low pressure measurement method using Pirani gauge and Ionization type vacuum gauge. 7+8=15