Total No. of printed pages = 7

RETEST 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. *All* questions of 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) Rayleigh current balance is a _____ instrument.

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

[Turn over

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

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

(e) Operation of a Pirani gauge depends on the variation of _____ of a gas with pressure.

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

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

(h) Barium Titanate may be used as a _____ transducer.

(i) Turbine flow meters are _____ flow meters.

(j) Diaphragms is an _____ transducer.

2. Write true or false : 1×10=10

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

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

(c) In an AC tachometer generator the magnet is fixed.

(d) Stroboscope is a portable manually operated device.

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

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

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

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

(i) Thermistors are fabricated from metals.

(j) Temperature measurement using thermoelectric sensor is discovered by Peltier.

3. Choose the correct answer : 1×5=5

(a) Piezo electric accelerometers are useful for

(i) low frequency (ii) high frequency

(iii) in all frequencies (iv) None of these

(b) Seismic accelerometer is used for the measurement of

(i) velocity (ii) acceleration

(iii) temperature (iv) pressure

(c) The conductivity of the liquid for the measurement of velocity of a liquid using electromagnetic flowmeter should be

(i) higher than 10μΩ/m

(ii) less than 10μΩ/m

(iii) equal to 10μΩ/m

(iv) None of the above

(d) In an AC tachometer generator the magnet is

(i) fixed (ii) moving

(iii) partially fixed (iv) None of the above

(e) Electromagnetic tachometer generators are used for the measurement of

(i) vibrations (ii) linear velocity

(iii) angular velocity (iv) acceleration

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) Compare the advantages and disadvantages of the deflection and null type instruments. 4

(b) Describe the major functions of instruments and measuring systems. 5

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 Piezoelectric transducer ? How can it be used to measure the developed potential inside it and the pressure imposed on it ? 1+4=5

   (b) A quartz crystal has charge sensitivity of 2pc / N. Its dielectric constant is 4.5 and Young's modulus is 9×10^{10} Pa. Find the voltage sensitivity constant. 4

8. Describe the methods of measuring the translation and rotational motion of an object using different types of self-generating inductive transducer. 9

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

10. Describe with neat sketch the Potentiometric type accelerometer and Piezoelectric accelerometer method for the measurement of acceleration of an object. 9

11. (a) What do you mean by 'Thermistor' ? What are the advantages of using thermistor for temperature measurements ? 2+3=5

   (b) For a certain transistor $\beta = 3140K$ and the resistance at 27°C is known to be 1050Ω. The thermistor is used for temperature measurement and the resistance measured is as 2330Ω. Find the measured temperature. 4