Total No. of printed pages = 6

END SEMESTER EXAMINATION – 2021

Semester : 5th (New Syllabus)

Subject Code : Et-507

ELECTRONICS INSTRUMENTATION

Full Marks – 70

Time – Three hours

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

Instruction :

- *All* questions of PART – A and PART – B are compulsory.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

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

   (b) Most of the indirect methods involve electrical techniques as they have _____ speed and also simple processing methods.

[Turn over

(c) The primary sensing element is also known as _____.

(d) Transducer is a device that converts variations in a physical quantity, such as pressure or brightness, into an _____, or vice versa.

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

(f) Diaphragm is a _____ transducer.

(g) Thermistors are fabricated from the _____ materials.

(h) Strain is defined as the displacement and _____ that occur.

(i) In case 1 of LVDT, when the core is at null position i.e., _____ displacement.

(j) The heated Pirani sensor filament is typically made of a thin less than _____ Tungsten, Nickel or Platinum wire.

2. Write true or false : $1 \times 10 = 10$

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

(b) Pirani gauge is used to measure the pressure of 10-8 mm of Hg.

(c) Barium Titanate may be used as a piezo-electric transducer.

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

(e) Types of Transducer based on the principle of Operation Photovoltaic.

(f) Active transducers are those which require any power source for their operation.

(g) A transducer should have good resolution over its entire range of operation.

(h) Apart from low static error transducers should have a high non linearity.

(i) A Pirani gauge chamber which encloses a Nickel filament.

(j) The most serious problem in using an ionization gauge is that it requires electron emission into a space that is not a perfect vacuum.

3. Choose the correct answer : 1×5=5

(a) Electromagnetic tachometer generators are used for measurement of

(i) vibrations

(ii) linear velocity

(iii) angular velocity

(iv) acceleration

(b) Seismic accelerometer is used for the measurement of

(i) velocity (ii) acceleration

(iii) temperature (iv) pressure

(c) In AC tachometer generator the magnet is

(i) fixed

(ii) moving

(iii) partially fixed

(iv) Does not matter

(d) Piezo-electric accelerometers are useful for

(i) low frequency (ii) high frequency

(iii) all frequencies (iv) None of these

(e) The DC tachometer works on the principle that when the closed conductor moves in the

(i) magnetic field

(ii) electric field

(iii) Both (i) and (ii)

(iv) None of these.

PART – B

Marks – 45

4. Define Transducer in details. Also explain the working principles of LVDT in details. 4+5=9

5. Explain the working principle of Photoelectric Transducer. Also differentiate between Piezo-electric Transducer and Photoelectric Transducer. 6+3=9

6. How can Piezo-electric Transducer be used to measure the developed potential inside it and pressure imposed on it ? Explain Pirani Gauge process in details. 4+5=9

7. Explain in details about Drag-cup tachometer. Also differentiate between DC tachometer and AC tachometer. 6+3=9

8. Explain the working principles of Radiation pyrometer. Also differentiate between Radiation pyrometer and Optical pyrometer. 6+3=9