(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2114 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. V) ODD SEMESTER THEORY EXAMINATION 2013-14

ELECTRICAL INSTRUMENTATION AND PROCESS CONTROL

EEN701

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2736 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. V) ODD SEMESTER THEORY EXAMINATION 2013-14

ELECTRICAL INSTRUMENTATION AND PROCESS CONTROL

Time : 3 Hours *Total Marks : 100*

Note :–Attempt **all** questions.

1. Attempt any **four** parts of the following : **(5×4=20)**

(a) Discuss various types of transducers with examples. What are the basic requirements of a transducer ?

(b) For a Transducer describe the following :

(i) Input Characteristics;

(ii) Transfer Characteristics;

(iii) Output Characteristics.

(c) Differentiate between primary and secondary transducer with the help of suitable examples along with their diagrams.

(d) A resistance wire strain gauge with a gauge factor of 2 is bonded to a steel structural member subjected to a stree of 500 kg/cm^2. The modulus of elasticity of steel is 2×10^6 kg/cm^2. Calculate the change in resistance of the strain gauge element due to the applied stress.

(e) What is LVDT ? Write its merits and demerits. Discuss its any two applications.

(f) What is an input device ? What is primary sensing element and why is it important ? Name different types of pressure elements.

2. Attempt any **two** parts of the following : **(10×2=20)**

(a) Explain working principle, merits and demerits of a capacitive transducer based on change in area of plates. Also find its sensitivity and draw related curves.

(b) A pressure measuring instrument uses a capacitive transducer having a spacing of 4 mm between its diaphragms. A pressure of 600 kN/m^2 produces an average deflection of 0.3 mm of the diaphragms of the transducer. The transducer which has a capacitance of 300pF before application of pressure and is connected in an oscillator circuit having a frequency of 100kHz. Determine the change in frequency of the oscillator after the pressure is applied to the transducer.

(c) (i) Describe the ionization type vacuum gauge method used for measurement of low pressure.

(ii) Explain the working principle of piezoelectric transducer with diagram and application.

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) What is Telemetry ? What are its components ? Describe motion and force balance current telemetering systems and also give their relative merits and demerits.

(b) What is a Data Acquisition System (DAS) ? Explain the role played by its different elements. Also, describe various types of multiplexer used.

(c) Discuss the basic elements of signal conditioning system. Explain the basic sample and hold operation. Also derive the block diagram approximation of the sample and hold device.

4. Attempt any **two** parts of the following : **(10×2=20)**

(a) Discuss the working principle of LED and LCD used in digital display devices. Also give their major advantages.

(b) Discuss the following marking mechanisms :

(i) Marking with ink filled stylus

(ii) Chopper bar

(iii) Electrostatic stylus

(iv) Optical marking method

(v) Electric stylus marking.

(c) Explain in brief :

(i) Fibre optic sensor

(ii) Micro sensors

(iii) Smart sensors.

5. Attempt any two parts of the following : **(10×2=20)**

(a) What is a 'process control' ? Explain with a suitable example. Also explain the three term control action.

(b) Explain the following :

(i) Process

(ii) Controlled variable

(iii) Set point

(iv) Self regulation

(v) Sensor.

(c) What are the important limitations of pneumatic controllers ? Give a brief description of such a controller.