Total No. of printed pages = 6

END SEMESTER EXAMINATION – 2019

Semester : 6th

Subject Code : CAI-602

TRANSDUCER AND SIGNAL CONDITIONING

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. Match the following : 1×8=8

Column – A	Column – B
(i) Strain gauge	(a) Optical transducer
(ii) Phototransistor	(b) Resistive transducer
(iii) Hall effect transducer	(c) Inductive transducer
(iv) Electromagnetic pick up	(d) Flow measurement.

[Turn over

PART – B

Marks – 45

4. (a) Give an example of primary and secondary transducer and describe its working. 4

(b) Describe the working of a potentiometer using a suitable diagram. Derive the expression for output voltage. 5

5. (a) Describe the basic principles of working of the following : 6

(i) Carbon Microphone

(ii) Condenser Microphone.

(b) Explain the working of an elastic type load cell. 3

6. (a) Sketch the diagram of bonded type and unbounded type strain gauges. Name the materials used to construct strain gauges. Also, mention the gauge factor. 4

(b) What are the basic principles of working of variable inductance transducer ? Describe the working of LVDT using a suitable diagram. 5

7. Describe the working of the following using suitable diagrams : 9

(i) Synchro

(ii) Seismic transducer.

(iii) Piezo-electric accelerometer.

8. (a) Describe a method for measurement of speed. 4

(b) Draw the diagram of phototransistor and explain its operation. 5

9. (a) Describe an application of capacitive transducer with a suitable diagram. Also, write the relevant mathematical expressions. 5

(b) What do you mean by voltage sensitivity and charge sensitivity in a piezo-electric transducer ? Mention some of the applications of piezo-electric transducer. 4

10. (a) Draw the circuit diagram for the following OPAMP applications. Also, write the circuit equations : 6

(i) Adder (ii) Inverter

(iii) Differentiator (iv) Subtractor

(b) Design an OPAMP amplifier with a gain of 30. 3

11 Explain the working of following circuits with suitable diagrams and mathematical expressions : 9

(i) Active low pass filter using OPAMP

(ii) D/A converter

(iii) Linearization circuits using OPAMP

12. Write short notes on the following : 9

(i) Encoder and Decoder

(ii) Multiplexer and Demultiplexer.