Total No. of printed pages = 4

CAI-403/PC&I/4th Sem/2017/M

PROCESS CONTROL AND INSTRUMENTATION

Full Marks – 70

Pass Marks – 28

Time – Three hours

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

Answer any *five* questions.

1. (a) What is a transducer ? Name some desirable characteristics of a transducer. 1+3=4

   (b) What do you mean by calibration ? Explain the need of calibration in measuring instruments. 1+2=3

   (c) Explain the different types of error found in measuring instruments. 5

   (d) Differentiate between null and deflection type instruments. 2

[Turn over

2. (a) Mention one input variable and corresponding output variable for the following transducers : 5

LVDT, RTD, Bourdon gauge, Thermocouple, Bimetallic strip.

(b) Explain the following terms in brief : 6

Static sensitivity, Resolution and Linearity.

(c) What is Gauge factor ? The resistance of a strain gauge having a length 'l' is 'R' ohms. Find its change in resistance (ΔR) due to change in length (ΔL) if the Gauge factor is G. 1+2=3

3. (a) Explain the construction and working of LVDT. 6

(b) Name one device for measurement of temperature and explain its working principle. 6

(c) The resistance of an unknown RTD is 75Ω at 30°C and 110Ω at 100°C. Find its temperature co-efficient. 2

4. (a) Define the terms : 4
speed, density, humidity and pH.

(b) Explain the construction and working of any one : 10

(i) Bourdon gauge for pressure measurement.

(ii) Capacitive based device for level measurement.

5. (a) What is an orifice plate ? Briefly explain the different types of orifice plates with diagrams. 1+8=9

(b) Explain the working of an ultrasonic flow-meter. 5

6. (a) Briefly explain the different components of an industrial process control system with a block diagram. 8

(b) Explain the following types of control systems : 6

(i) Open - loop

(ii) Closed - loop

(iii) Feed forward

7. Write short notes on any *two* : 7+7=14

(a) Biosensors

(b) Dryers

(c) Evaporators

(d) Reactors.