22333

12223

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

(7) Preferably, write the answers in sequential order.

Marks

1. Attempt any FIVE of the following : **10**

(a) Define the term 'error'. State types of errors.

(b) State parameters that can be measured by analog multimeter.

(c) List any four applications of CRO.

(d) Sketch block diagram of Instrumentation system.

(e) Classify the temperature measuring transducer.

(f) State the application of Bourdon tube.

(g) State the need of signal conditioning.

2. Attempt any THREE of the following : **12**

(a) Explain various types of standards in instrument with suitable example.

(b) Explain with neat sketch working principle of PMMC.

(c) Sketch labelled diagram of CRT.

(d) Describe the working principle of C-shaped Bourdon tube with neat sketch.

3. Attempt any THREE of the following : **12**

(a) Explain with neat sketch the operation of analog multimeter.

(b) Explain with sketch the procedure to measure following parameter using CRO :

(i) Frequency

(ii) Phase angle

(c) Sketch and describe RTD.

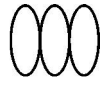
(d) Describe the function of each block of DAS.

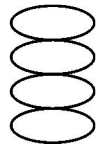
4. Attempt any THREE of the following : **12**

(a) Convert the PMMC movement into a DC-ammeter of the range 0 to 200 mA.

(b) Calculate the frequency of vertical input for an CRO for the following Lissajous figures.

(Horizontal input frequency is 10 kHz)

(i) 

(ii) 

(c) Suggest the suitable transducer for the following measurement :

(i) Humidity

(ii) Stresses

(iii) Pressure

(iv) Linear displacement

(d) Justify piezoelectric transducer active or passive. Also state the principle of operation of piezoelectric transducer.

(e) Sketch AC signal conditioning circuit for level measurement.

5. Attempt any TWO of the following : **12**

(a) The expected value of the voltage across a resistor is 80 V. However, the measurement gives a value of 79 V. Calculate :

(i) Absolute error

(ii) % error

(iii) Relative accuracy

(iv) Percentage accuracy

(v) Error expressed as a percentage of the full scale reading if the full scale deflection is 0-100 V.

(b) Sketch and describe pressure measurement system for 800 mm pressure that contain Bourdon tube & LVDT.

(c) Sketch the DC signal conditioning circuit for pressure measurement using strain gauge. Justify it.

6. Attempt any TWO of the following : **12**

(a) Draw the block diagram of dual beam oscilloscope. Compare it with single beam oscilloscope (any **six** points).

(b) Describe difference between the transducer and sensors (**six** points). State most commonly used temperature sensor with justification.

(c) (i) Calculate the resistance of PT 100 for 50°C.

(ii) Explain different types of Thermocouple.