

22333

21819

3 Hours / 70 Marks

Seat No.

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- 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.

Marks

1. Attempt any FIVE of the following :

10

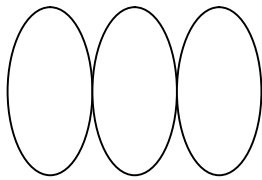
- (a) Write any two applications of Instrumentation System.
- (b) Define :
 - (i) Resolution
 - (ii) Accuracy
- (c) Sketch Block diagram of vertical deflection system used in CRO.
- (d) Define :
 - (i) Sensor
 - (ii) Transducer
- (e) List any four types of transducer.
- (f) State need of level measurement.
- (g) Write objective of Data acquisition system.

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

- (a) Define any two dynamic characteristics of measurements.
- (b) Draw PMMC meter movement and describe it.
- (c) Describe the block diagram of function generator.
- (d) Explain with sketches, the working principle of Bourdon tube.

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

- (a) Compare Analog meter and Digital meter.
- (b) Calculate the frequency of channel-1 Input for an oscilloscope when shows the following Lissajous patterns. Assume the channel-2 frequency 15 kHz.



Lissajous Patterns

- (c) Sketch and describe the working principle of LVDT.
- (d) (i) Define signal conditioning system.
(ii) Draw the circuit diagram of DC signal conditioning circuit.

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

- (a) Draw the block diagram of successive approximation type ADC. Draw the SAR register waveform for unknown voltage, $V_X = \sigma$ volts.
- (b) A 1 mA meters movement with an internal resistance of $100\ \Omega$ is to be converted into a 0 – 100 mA. Calculate the value of shunt resistance required.
- (c) Sketch the block diagram of function generator & describe the circuit of sine wave generation.

- (d) Compare thermistor and thermocouple.
- (e) Draw and describe general Data acquisition system.

5. Attempt any TWO of the following :

12

- (a) Describe the need for calibration.
- (b) Explain the electro-magnetic flow meter with neat sketch and write it's application.
- (c) Describe the circuit diagram of AC signal conditioning.

6. Attempt any TWO of the following :

12

- (a)
 - (i) Compare CRO and DSO.
 - (ii) State the formula for phase measurement using CRO with necessary diagram.
 - (b)
 - (i) Write one example and application of thermal, optical, magnetic and electric sensor.
 - (ii) State four selection criteria of transducer.
 - (c)
 - (i) State the principle of Humidity measurement using hygrometer.
 - (ii) State the type of humidity measurement and range with it.
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