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15116

3 Hours / 100 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. a) Attempt any SIX of the following:** **12**
- (i) Give comparison between active transducer and passive transducer.
 - (ii) List any two static characteristic of instrument.
 - (iii) Draw the block diagram of dual trace oscilloscope.
 - (iv) List different flow measurement technique.
 - (v) List out four applications of CRO.
 - (vi) State any two requirements of signal generator.
 - (vii) Define transducer and state any two advantages of electrical transducer.
 - (viii) Give the classification of transducers.

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b) Attempt any TWO of the following:

- (i) What is the working principle of LVDT? State its applications.
- (ii) State the formula for % error and relative accuracy. What is error and list out its types?
- (iii) With neat sketch explain the working principle of PMMC.

2. Attempt any FOUR of the following: 16

- a) Explain the deflection of electron beam in CRT with diagram.
- b) Describe the working principle and construction of electromagnetic flow meter.
- c) Explain the working principle of ultrasonic level detector.
- d) Convert a basic D' Arsonval movement with an internal resistance of $50\ \Omega$ and full scale deflection current 2 mA into multirange dc voltage with voltage ranges of 0-10 V, 0-50 V, 0-100 V and 0-250 V.
- e) List the application of spectrum analyzer.
- f) With neat schematic diagram illustrate the working principle of digital frequency meter.

3. Attempt any FOUR of the following: 16

- a) Draw the circuit diagram of rectifier type AC voltmeter. Explain its working.
- b) Draw the block diagram of logical analyzer and explain it.
- c) Define resolution and sensitivity of digital meter.
- d) Draw the block diagram of horizontal deflection system and draw the waveform across each block.
- e) Give the construction and working principle of RTD with neat sketch.
- f) Draw the neat block diagram of DSO. List its applications.

4. Attempt any FOUR of the following: 16

- a) Draw and explain working principle of function generator.
- b) Differentiate between logical analyzer and spectrum analyzer.
- c) Explain the method of frequency measurement using Lissajous pattern.
- d) Draw the block diagram of pattern generator.
- e) Identify active and passive transducer from the following:
 - (i) Thermocouple
 - (ii) RTD
 - (iii) Piezoelectric
 - (iv) LVDT
- f) What is Piezoelectric effect? How it is used in transducers? List the material used for it.

5. Attempt any FOUR of the following: 16

- a) Differentiate between RTD and thermistor with respect to the following points:
 - (i) Material
 - (ii) Working principle
 - (iii) Cost
 - (iv) Range of measurement
- b) State the applications of spectrum analyzer.
- c) Explain with diagram, AF sine, wave generator.
- d) What is seebeck effect? What is Peltier effect? Give one example of each.
- e) Write the advantages and disadvantages of electromagnetic flow meter.
- f) How resistive transducers are classified according to their movement? Explain its working.

6. Attempt any FOUR of the following:**16**

- a) Distinguish between analog and digital instruments. (any four points)
 - b) Draw the block diagram of digital multimeter. State any four advantages.
 - c) State the need of synchronization between horizontal and vertical deflection in CRO.
 - d) Define:
 - (i) Accuracy
 - (ii) Precision
 - (iii) Sensitivity
 - (iv) Resolution
 - e) How basic analog DC ammeter operates with proper example justify its range extension method.
 - f) 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) Relative accuracy
 - (iii) % error
 - (iv) % accuracy
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