

Time: 2:30 hours

Marks: 80

Instructions: 1. Question number 1 is compulsory.

2. Attempt any three questions from the remaining five questions.

3. Assume suitable data wherever necessary.

Q1. Attempt any four questions.

[20]

- a) Classify and define the following characteristics of instruments
 - (i) Linearity
 - (ii) Resolution
 - (iii) Sensitivity
 - (iv) Fidelity
- b) Draw and explain in brief, resistance measurement using Kelvin's Bridge.
- c) Explain what you mean by dual trace in cathode ray oscilloscope (CRO).
- d) List criteria for selection of transducers and explain any one in detail.
- e) Explain the need for calibration in instruments.

Q2. a) With proper circuit diagram explain inductance measurement using Maxwell's bridge. Also derive the necessary equations.

[10]

- b) A set of independent current measurements were taken by six observers and were recorded as 12.8A, 12.2A, 12.5A, 13.1A, 12.9A, 12.4A

Calculate

- (i) Arithmetic mean
- (ii) Deviations from the mean
- (iii) Average Deviation
- (iv) Standard Deviation
- (v) Variance

[10]

Q3. a) Draw and explain block diagram of CRO in detail.

[10]

- b) Explain construction, working principle and application of LVDT with neat diagram.

[10]

Q4. a) List types of DC Voltmeters. Hence with neat labeled diagram, describe the operation of any one type in detail.

[10]

- b) Explain with diagrams the measurement of frequency and phase using CRO with Lissagous Patterns.

[10]

Q5. a) In an electric water heater, the change of temperature of water is to be measured. Which transducer will you use for this application? Describe its operation with a neat diagram.

[10]

- b) Write a detailed note on signal generators.

[10]

Q6. Write short notes on (Any Four)

[20]

- a) DMM as a standard instrument for calibration.
- b) Ultrasonic Transducers.
- c) Speed of response of measuring instrument.
- d) Megger.
- e) Load Cell.
- f) Harmonic distortion analyzer.