

Roll No. to be filled in your Answer Book

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**B. Tech**

THIRD SEMESTER UTU EXAMINATION, 2013-14

**Electronic Measurement and Instrumentation**

Time : Three Hours [Max. Marks : 100]

Note:- Attempt All Questions. All Questions carry equal marks.

Q1. Attempt any four Questions of the following:-

4x5=20

- (a) A voltmeter has a range of 0-5 V. The true value of the measured voltage is 3 v, while the read value is 2.95 V. What is the absolute error and relative error?
- (b) Write the need of calibration and explain process of calibration.
- (c) Explain Series ohmmeter.
- (d) What is the principle of working of magnetic recorders? Explain the recording process.
- (e) Write a short note on PMMC instruments.
- (f) Explain plotters.

(b) Define sensitivity and deflection factor of a Cathode Ray Tube(CRT). What are the role of the following in CROs:

- (i) Time base generator circuit
- (ii) X-channel
- (iii) Triggered Sweep
- (iv) Astigmatism

(c) Explain the basic elements of a function generator. What is the importance of:

- (i) Duty cycle
- (ii) Rise time

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**Q2. Attempt any four Questions of the following:- 4x5=20**

- (a) What is dynamic response? Explain the various types of dynamic response. How are they differ from dynamic characteristics?
- (b) Distinguish between direct and indirect methods of measurement. Give examples to support your answer.
- (c) Compare features of digital and analog voltmeters based on advantages and applications.
- (d) Explain the Quieting method to measure sensitivity of communication receivers.
- (e) Derive an expression for the sensitivity of a Wheatstone bridge.
- (f) Write the DSO applications.

**Q3. Attempt any two Questions of the following:- 2x10=20**

- (a) (i) Define the following with respect to the measuring system:
  - (1) True value
  - (2) Static correction
  - (3) Relative error
  - (4) Reproducibility
- (ii) Explain the working of a True RMS voltmeter.
- (b) Draw a circuit diagram of a Q-meter and explain its working. Give its applications.
- (c) (i) Explain with the help of a diagram the working of simple multimeter.
- (ii) Explain an arrangement for the measurement of Standing Wave Ratio.

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**Q4. Attempt any two Questions of the following:- 2x10=20**

- (a) A voltmeter having a sensitivity of  $100\ \Omega/V$  reads 100V on its 150 V scale when connected across an unknown resistor in series with a milli-ammeter. When the milli-ammeter reads 5mA, Calculate
  - (1) apparent resistance of the unknown resistor,
  - (2) actual resistance of the unknown resistor and
  - (3) error due to the loading effect of voltmeter.
- (b) Explain D/A and A/D converters w.r.t signal conditioning of the inputs.
- (c) Explain the working of Digital Data Recording. Give its applications.

**Q5. Attempt any two parts of the following 2x10=20**

- (a) (i) Draw the scheme of a Multi-range ammeter. Design a multi-range DC ammeter with an internal resistance  $10\ \Omega$ . The full scale deflection current is 10 mA and it is required to measure 0 to 50 mA, 0 to 100 mA and 0 to 250 mA.
- (ii) Bring out the difference between CRO and recorders. Draw the schematic of a simple X-Y recorder.

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P.T.O.