

EC - 303

B.E. III Semester Examination, December 2014

Electronic Instrumentation

Time : Three Hours

Maximum Marks :70

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
ii) All parts of each question are to be attempted at one place.
iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) The expected value of the voltage across a resistor is 80v. However, the measurement gives a value of 79V. Calculate
 - i) Absolute error
 - ii) % error
 - iii) Relative accuracy and
 - iv) % of accuracy
- b) A basic D' arsonval movement with a full scale deflection of 50 μ A and internal resistance of 500 Ω is used as a voltmeter. Determine the value of the multiplier resistance needed to measures a voltage range of 0-10 V. Also derive the formula used.
- c) Discuss linearity and its different aspects with graphs.
- d) Describe with a diagram the operation of a chopper type microvoltmeter.

OR

What is a bolometer? Explain with diagram the operation of a bolometer bridge for measurement of power.

Unit - II

2. a) List the advantages of using negative supply in a CRO.
- b) State the function of a delay line used in the vertical section of an oscilloscope.
- c) State the function of a probe and explain with a diagram the operation of a 10:1 probe.
- d) Describe with diagram the operation of a sampling CRO. State the function of the staircase generator used in a sampling CRO.

OR

Describe with a block diagram the operation of a digital storage CRO. State the functions of each block.

Unit - III

3. a) A sheet of 4.5 mm thick bakelite is tested of 50 Hz between 12 cm in diameter. The schering bridge uses a standard air capacitor C_2 of 105 pF capacitor, a non-reactive, R_4 of $1000/\pi$ in parallel with a variable capacitor and is obtained with $C_4 = 0.5 \mu\text{F}$ and $R_3 = 260 \Omega$. Calculate the capacitance, PF and relative permittivity of the sheet.
- b) Explain the working principle of a resistance temperature detector.
- c) State and derive the two balance conditions for a Wien bridge.
- d) Define gauge factor and derive the expression of it for resistance wire strain gauge.

OR

Describe the working and construction of a Rotational Variable Differential Transducer (RVDT).

Unit - IV

4. a) State the function of frequency sweeper and marker generator in a sweep generator.
- b) State the important features of LCDs.
- c) Give reasons for the following:
- Dot matrix presentation is more popular than bar matrix in character generation in CRT.
 - Reflective LCDs comparison with over transmissions LCDs.
 - Bar graphs have unique role in electronic display system.
- d) State with a diagram the working principle of a pulse generator.

OR

Explain the working principle of a beat frequency oscillator. State its applications.

Unit - V

5. a) State the operating and performance characteristics of a digital voltmeter.
- b) A $4\frac{1}{2}$ digit voltmeter is used for voltage measurements.
- Find its resolution
 - How would 12.98 V be displayed on a 10 V range?
 - How would 0.6973 be displayed on 1V and 10 V ranges.
- c) Explain weighted converter using transistor switches.
- d) Describe with a diagram the operation of ramp-type DVM.

OR

Explain with the help of diagram the working principle of dual slope type DVM.
