Roll No ....

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 µA and internal resistance of 500Ω 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/π in parallel with a variable capacitor and is obtained with $C_4 = 0.5 \mu F$ 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:

   i) Dot matrix presentation is more popular than bar matrix in character generation in CRT.

   ii) Reflective LCDs comparison with over transmissions LCDs.

   iii) 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 4½ digit voltmeter is used for voltage measurements.

   i) Find its resolution

   ii) How would 12.98 V be displayed on a 10 V range?

   iii) 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.

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