Third Semester B.E. Degree Examination, December 2010
Electronic Instrumentation

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1.
   a. Define accuracy, precision and significant figure. (06 Marks)
   b. A true value of voltage across a resistor is 50V, the instrument reads 49V. Calculate the absolute error and percentage error. (04 Marks)
   c. Explain with a circuit diagram, how a basic D' Arsonval movement can be converted into a DC voltmeter. Calculate a multiplier resistance required to measure voltage range of $(0 - 25)$V, when $R_M = 50$ ohms, $I_g = 50$ μA. (10 Marks)

2.
   a. With a neat block diagram, explain the working principle of true RMS voltmeter. (07 Marks)
   b. Write the advantages of a digital instrument over analog instruments. (03 Marks)
   c. With a neat circuit diagram, explain the working of Ramp type DVM. (10 Marks)

3.
   a. With a neat block diagram, explain the working of digital frequency meter. (07 Marks)
   b. Draw and explain the block diagram of CRT. (07 Marks)
   c. Discuss the operation of electronic switch in oscilloscope. (06 Marks)

4.
   a. What is Barkhausen criterion? With a neat block diagram, explain the working of standard signal generator. (10 Marks)
   b. What is sweep frequency generator? (04 Marks)
   c. Draw and explain the block diagram of sampling oscilloscope. (06 Marks)

PART – B

5.
   a. What is a transducer? Explain the working of resistive position transducer. (07 Marks)
   b. With a neat diagram, explain the principle and working of a LVDT. (09 Marks)
   c. A resistance strain gauge with a gauge factor of 4 is connected to a steel member which is subjected to a strain of 1×10^{-6}. If the original gauge resistance is 150 ohms. Calculate the change in resistance. (04 Marks)

6.
   a. Derive an expression for capacitance comparison bridge at balance condition and calculate capacitance impedance at a frequency of 2 kHz, the bridge components are $C_3 = 100$ μF, $R_3 = 100$ kΩ, and $R_2 = 50$ kΩ. (09 Marks)
   b. Derive the bridge balance equation for the Kelvin's double bridge. (07 Marks)
   c. Explain the sources and detectors in the bridge circuits. (04 Marks)

7.
   a. What is bolometer? Explain RF power measurement using bolometer bridge. (07 Marks)
   b. Give the classification of digital displays. Compare the LEDs and LCDs. (08 Marks)
   c. Explain in brief, the working of the photovoltaic transducer. (05 Marks)

8. Explain the following:
   a. Piezo-electric transducer
   b. Signal conditioning circuits
   c. Photo transistor
   d. Wagner earth connection

   (20 Marks)

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