Third Semester B.E. Degree Examination, May/June 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 the following terms as applied to an electronic instrument:
     i) Accuracy   ii) Precision   iii) Resolution   **(06 Marks)**
   b.   Explain the working of a true RMS voltmeter, with the help of a suitable block diagram.   **(06 Marks)**
   c.   Convert a basic D'Arsonval movement with an internal resistance of 50 Ω and a full scale deflection current of 2 mA into a multrange dc voltmeter with voltage ranges of 0 – 10 V, 0 – 50 V, 0 – 100 V and 0 – 250 V.   **(08 Marks)**

2   a.   Differentiate analog meters and digital meters.   **(04 Marks)**
   b.   Explain the principle of operation of a digital frequency meter with the help of a block diagram.   **(10 Marks)**
   c.   A $4\frac{1}{2}$ digit voltmeter is used for voltage measurements:
     i)   Find its resolution   ii) How would 12.98 V displayed on a 10 V range?
     iii) How would 0.6973 be displayed on 1 V and 10 V ranges?   **(06 Marks)**

3   a.   Draw the basic block diagram of an oscilloscope. Explain the function of each block.   **(08 Marks)**
   b.   Describe the following modes of operation available in a dual trace oscilloscope:
     i) ALTERNATE mode   ii) CHOP mode.   **(06 Marks)**
   c.   Explain the operation of an electronic switch, with the help of a block diagram.   **(06 Marks)**

4   a.   With the help of a neat diagram, explain the working of sampling oscilloscope.   **(10 Marks)**
   b.   With the help of a neat block diagram, explain the operation of a digital storage oscilloscope. Mention the advantages.   **(10 Marks)**

PART – B

5   a.   Explain the working of AF sine and square wave generator.   **(10 Marks)**
   b.   With a block diagram, explain the working of pulse generator.   **(10 Marks)**

6   a.   What are the limitations of wheat stone's bridge? Derive the balance equation of Kelvin's bridge.   **(06 Marks)**
   b.   An unbalanced wheat stone's bridge is shown in Fig.Q6(b). Calculate the current through the galvanometer.   **(06 Marks)**
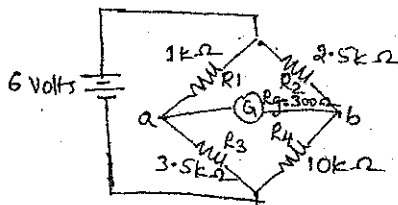

Fig.Q6(b)

   c.   Derive the equation to measure an inductive impedance of a Maxwell's bridge. Also find the series equivalent of the unknown impedance if the bridge constants at balance are $C_1 = 0.01$ μF, $R_1 = 470$ kΩ, $R_2 = 5.1$ kΩ and $R_3 = 100$ kΩ.   **(08 Marks)**

7   a.   What is gauge factor? Derive appropriate relation for the same.   **(10 Marks)**
   b.   Explain the construction, principle and operation of LVDT. Show characteristic curves. How is the direction of motion determined?   **(10 Marks)**

8   a.   Explain important features of LCDs.   **(06 Marks)**
   b.   Explain how power is measured, using a suitable bolometer bridge diagram.   **(06 Marks)**
   c.   Write a short note on signal conditioning system.   **(08 Marks)**