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Third Semester B.E. Degree Examination, Dec.2017/Jan.2018
Electronic Instrumentation

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. The expected value of the voltage across a resistor is 80V. But, the measurement gives a
       value of 79V. Calculate
       (i) Absolute Error   (ii) % Error   (iii) Relative Accuracy   (iv) % of Accuracy. **(05 Marks)**

   b. Fig.Q1(b) shows a series circuit of R_1 and R_2 connected to a 100 V dc source. If the voltage
       across R_2 is to be measured by voltmeters having
       (i) a sensitivity of 1 kΩ/V   and (ii) a sensitivity of 20 kΩ/V
       Find which voltmeter will read the accurate value of voltage across R_2 , if both the
       voltmeters are used on the 50 V range.   **(10 Marks)**
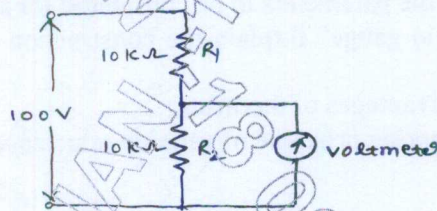

Fig.Q1(b)

   c. Draw the circuit diagram of dc coupled peak voltmeter and illustrate the working principle.
       Mention the limitations of peak responding voltmeter.   **(05 Marks)**

2 a. Discuss about the principle of operation of integrating type DVM with the help of block
       diagram and associated waveforms.   **(08 Marks)**

   b. With the help of block diagram, explain how a time base with a range of 1 μs – 1 sec can be
       generated using fixed frequency crystal oscillator.   **(05 Marks)**

   c. Define the resolution and sensitivity of digital voltmeter.   **(04 Marks)**

   d. Mention the advantages and limitations of Ramp type DVM.   **(03 Marks)**

3 a. With the help of block diagram, explain the role of vertical amplifier in deciding the
       sensitivity and bandwidth of oscilloscope.   **(08 Marks)**

   b. Draw the block diagram of dual beam CRO and illustrate its working principle.   **(07 Marks)**

   c. Discuss the need for delay line in the vertical section of an oscilloscope.   **(05 Marks)**

4 a. Explain the working principle of sampling oscilloscope with a neat block diagram and
       associated waveforms.   **(10 Marks)**

   b. With a neat block diagram and associated waveforms explain the working principle of
       digital storage oscilloscope.   **(10 Marks)**

PART – B

5 a. Draw the block diagram of modern laboratory signal generator and explain the function of its constituent blocks. **(10 Marks)**

b. Specify the requirements of a pulse which can be generated using pulse generator. **(03 Marks)**

c. With a neat block diagram explain how output frequency can be automatically varied over predetermined range using sweep frequency generator. **(07 Marks)**

6 a. Obtain the Thevenin's equivalent circuit of a slightly unbalanced Wheatstone's bridge. Calculate the current through the galvanometer connected between bridge output terminals if the resistance of 3 arms of the bridge is 700 Ω each and the resistance of 4th arm of the bridge is 735 Ω. **(10 Marks)**

b. Derive the expression for unknown capacitance and its leakage resistance in a capacitance comparison bridge. **(07 Marks)**

c. Mention the applications of Maxwell bridge and Wein bridge. **(03 Marks)**

7 a. Discuss about the parameters to be considered for any electrical transducer. **(05 Marks)**

b. What is a strain gauge? Explain the construction and working principle of semiconductor strain gauge. **(06 Marks)**

c. Mention the advantages of thermistor. **(04 Marks)**

d. Explain the working principle of variable reluctance type transducer. **(05 Marks)**

8 a. Explain the following with respect to thermocouple:
   (i) Seebeck effect
   (ii) Thomson effect
   (iii) Thermocouple types **(07 Marks)**

b. Mention the classification of display devices. **(05 Marks)**

c. With a neat sketch explain how RF power can be measured using Bolometer bridge. **(08 Marks)**

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