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10IT35

Third Semester B.E. Degree Examination, June/July 2018
Electronic Instrumentation

Time: 3 hrs. Max. Marks:100

Note: ***Answer 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. **(07 Marks)**

c. Find the voltage reading and % error of each reading obtained with a voltmeter on, (i) 5 V range (ii) 10 V range, If the instrument has a 20 KΩ/V sensitivity and is connected across R_b. Comment upon the results.[Refer Fig. Q1 (c)] **(07 Marks)**

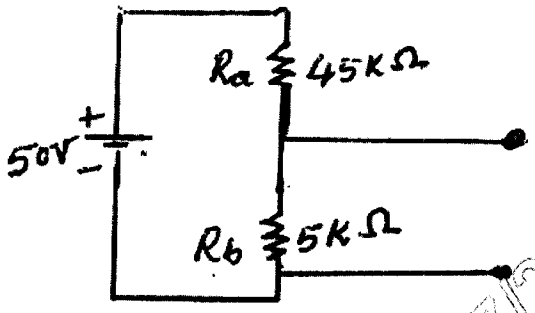

Fig. Q1 (c)

2 a. Explain the working of a digital frequency meter with the help of a block diagram. **(08 Marks)**

b. Discuss the operation of dual slope integration type DVM with the help of block diagram (V-T). **(08 Marks)**

c. Determine the resolution of a $3\frac{1}{2}$ digit display on 1 V and 10 V ranges. **(04 Marks)**

3 a. Draw the basic block diagram of CRO, explain the functions of each block. **(10 Marks)**

b. Explain the C.R.T features briefly. **(04 Marks)**

c. Discuss the operation of an Electronic switch in oscilloscope. **(06 Marks)**

4 a. Explain the operation of digital storage oscilloscope with the help of a block diagram, mention the advantages. **(10 Marks)**

b. Write an explanatory note on sampling oscilloscopes. **(10 Marks)**

PART – B

5 a. Explain the operating principle of a function generator with the help of a block diagram. **(08 Marks)**

b. Explain the operation of a conventional standard signal generator with the help of a block diagram. Mention the applications. **(08 Marks)**

c. Differentiate between pulse and square waves. Also mention their applications. **(04 Marks)**

6 a. What are the limitations of Wheat Stone's bridge? Derive the balance equation of Kelvin bridge. **(05 Marks)**

b. 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 $C_1 = 0.01\ \mu F$, $R_1 = 470\ K\Omega$, $R_2 = 5.1\ K\Omega$ and $R_3 = 100\ K\Omega$ **(07 Marks)**

c. Explain the operating of the Wien's bridge with a neat circuit diagram. Derive the expression for the frequency. **(08 Marks)**

7 a. Distinguish between active and passive transducers with an example. **(04 Marks)**

b. Explain the construction, principle and operation of LVDT, show characteristic curves. How is the direction of motion determined and list any three advantages. **(12 Marks)**

c. A platinum temperature transducer has a resistance of 100 Ω at 25°C,

(i) Find its resistance at 75°C if the platinum has a temperature co-efficient of 0.00392/°C.

(ii) If the platinum temperature transducer has a resistance of 200 Ω.

Calculate the temperature use linear approximation. **(04 Marks)**

8 a. What is Bolometer? Explain RF power measurement using bolometer bridge. **(07 Marks)**

b. Give the classification of digital displays, compare the LED's and LCD's. **(06 Marks)**

c. A small AF voltage of 15 V is super imposed on the RF test power and balance is achieved. If the RF test power is now turned off, 25 V AF is required to balance the bridge. If the bridge arms has a resistance of 200 Ω. Calculate the RF test power. **(04 Marks)**

d. A resistance strain gauge with a gauge factor of 4 is cemented to a steel member which is subjected to a strain of 1×10^{-6}. If the original gauge resistance is 150 Ω, calculate the change in resistance. **(03 Marks)**

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