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## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Third Semester, B.E. – Electronics and Communications Engineering

Semester End Examination; Dec. - 2014

### Measurements and Instrumentation

Time: 3 hrs

Max. Marks: 100

- Note:* i) Answer **FIVE** full questions, selecting **ONE** full question from each Unit.  
ii) Assume suitable missing data if any.

#### Unit - I

- 1 a. Define three following terms as applied to an electronic instrument; 6  
i) Accuracy ii) Precision iii) Resolution.
- b. Convert a basic D'Arsonval movement with an internal resistance of  $50 \Omega$  and a full scale deflection of 2 mA current into a multi range DC voltmeter with voltage ranges of 0 – 10 V, 0 – 50 V, 0 – 100 V and 0 – 250 V. Draw the multipliers connected in series with resistance values. 10
- c. With the help of neat diagram explain the principle of a successive approximation DVM. 4
- 2 a. Define the following terms as applied to an electronic instrument; 4  
i) Gross error ii) Systematic error
- b. Calculate the value of multiplier resistance for the multiple range dc voltmeter (5 V, 10 V and 50V) having  $I_{fsd} = 50 \mu A$ ,  $R_m = 1 k\Omega$ . 6
- c. With the help of block diagram explain the working of a integrating type DVM. 10

#### Unit - II

- 3a. Find the current through the galvanometer of an unbalanced wheat stone bridge Fig. 3 (a). 6
- b. Find the value of  $R_x$  in the Kelvin's bridge as in Fig. 3 (b) with  $R_a/R_b = 1000$ ,  $R_1 = 5 \Omega$ ,  $R_1 = 0.5 R_2$ . 4
- c. With the help of neat diagram explain the working of a Wein's bridge. 10
- 4 a. A capacitance comparison bridge is used to measure a capacitance impedance at a frequency of 2 kHz. Bridge constants at balance are  $C_3 = 100 \mu F$ ,  $R_1 = 10 k\Omega$ ,  $R_2 = 50 k\Omega$ ,  $R_3 = 100 k\Omega$ . Find the equivalent series circuit of the unknown impedance. 6
- b. With neat diagram explain the working of a Maxwell's bridge. What are its limitations, advantages and applications? 8
- c. Explain how the effect of stray capacitances in eliminated using Wagner's earth connection. 6

#### Unit - III

- 5 a. What are the parameters an electrical transducer must have? Explain. 6
- b. List eight important advantages of resistance thermistors. 8

- c. What are the advantages and limitations of thermister? 6
- 6 a. What are the important points to be reimbursed while selecting a transducer? Explain. 8
  - b. A resistance strain gauge with a gauge factor of 2 in cemented to a steel member, which is subjected to a strain of  $1 \times 10^{-6}$ . If the original resistance value of the gauge in  $130 \Omega$ . 4  
Calculate change in resistance.
  - c. List important desirable characteristics of resistance wire strain gauge. 8

**Unit - IV**

- 7 a. Write an explanatory note on Piezo electric transducer. 8
  - b. What are the advantages of using LEDs in electronic displays? Explain. 8
  - c. What is a basic sine wave generator? 4
- 8 a. List important features of LCDS. 6
  - b. Explain the construction, characteristics and one application of phototransistor. 8
  - c. With neat diagram explain the working of AF sine and square wane generator. 6

**Unit - V**

- 9 a. Explain the working of delayed time base oscilloscope. 10
  - b. Explain the working of a frequency selective wave analyzer. 10
- 10 a. Write explanatory notes on:
  - i) Bi stable storage CRT 10
  - ii) Variable persistence storage CRT.
- b. Explain Wien's bridge and Bridge T – Network method of harmonic distortion analyzer. 10

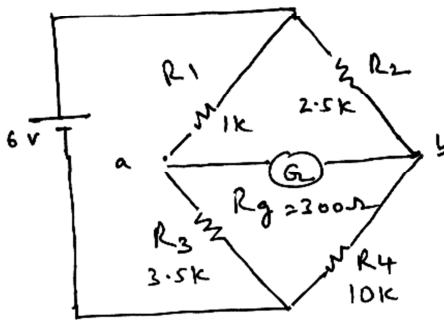


Fig 3(a)

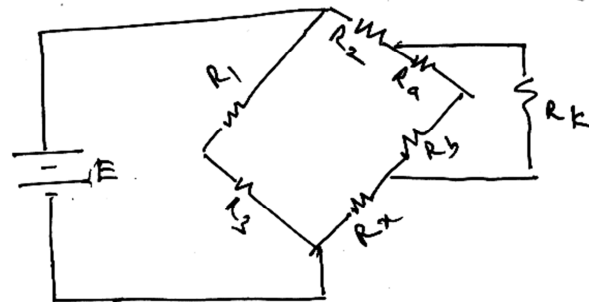


Fig 3(b)

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