

# CBCS Scheme

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15EC35

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

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

### Module-1

- 1 a. Define: i) Absolute error ii) Significant Figures. (04 Marks)
- b. A component manufacturer constructs certain resistors to be anywhere between  $1.14\text{k}\Omega$  and  $1.26\text{k}\Omega$  and classifies them as  $1.2\text{k}\Omega$  resistors. What tolerance should be stated? If the resistance values are specified at  $25^\circ\text{C}$  and the resistors have a temperature coefficient of  $+500\text{ppm}/^\circ\text{C}$ , calculate the maximum resistance of one of these components at  $75^\circ\text{C}$ . (06 Marks)
- c. Design a multirange ammeter with range of 0-1A, 5A, and 10A employing individual shunt at each A D'Arsonval movement with an internal resistance of  $500\Omega$  and a full scale deflection of 10mA is available. (06 Marks)

OR

- 2 a. Calculate the value of multiplier resistance on the 50V range of a dc voltmeter that uses a  $500\mu\text{A}$  meter movement with an internal resistance of  $1\text{k}\Omega$ . (04 Marks)
- b. Explain true RMS voltmeter with a neat diagram. (06 Marks)
- c. Two different voltmeters are used to measure the voltage across  $R_b$  in the circuit of Fig. 2(c). The meters are as follows :  
Meter 1 :  $S = 1\text{k}\Omega/\text{V}$ ,  $R_m = 0.2\text{k}$ , range 10V  
Meter 2 :  $S = 20\text{k}\Omega/\text{V}$ ,  $R_m = 1.5\text{k}$ , range 10V  
Calculate :
  - i) Voltage across  $R_b$  without any meter across it
  - ii) Voltage across  $R_b$  when the meter 1 is used
  - iii) Voltage across  $R_b$  when the meter 2 is used
  - iv) Error in the voltmeters.

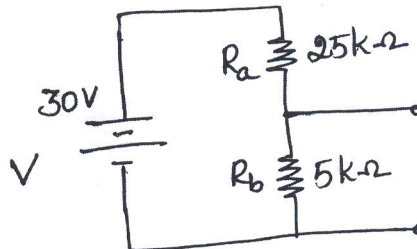


Fig. Q2(c)

(06 Marks)

### Module-2

- 3 a. Explain the working of successive approximation DVM with the help of block diagram. (08 Marks)
- b. Draw basic block diagram of a microprocessor based ramp type DVM and explain its operation with waveforms. (08 Marks)

OR

- 4 a. Explain digital frequency meter with the help of block diagram. (08 Marks)  
b. Explain digital pH meter. (08 Marks)

**Module-3**

- 5 a. Explain the function of various blocks in CRO with suitable diagram. (06 Marks)  
b. Explain the working of Time base generator. (06 Marks)  
c. Discuss frequency measurements with Lissajous figures. (04 Marks)

OR

- 6 a. Explain function generator with suitable diagram. (08 Marks)  
b. Explain sweep generator with block diagram. (08 Marks)

**Module-4**

- 7 a. Explain Q-meter with suitable circuit diagram. (06 Marks)  
b. Explain Basic Megger Circuit. (06 Marks)  
c. Discuss stroboscope. (04 Marks)

OR

- 8 a. Explain the Wheatstone bridge and using Thevenin's theorem, determines the amount of deflection due to unbalance of Wheatstone Bridge. (08 Marks)  
b. An inductance comparison bridge is used to measure inductive impedance at a frequency of 5KHz. The bridge constants at balance are  $L_3 = 10\text{mH}$ ,  $R_1 = 10\text{k}\Omega$ ,  $R_2 = 40\text{k}\Omega$ ,  $R_3 = 100\text{k}\Omega$ . Find the equivalent series circuit of the unknown impedance. (04 Marks)  
c. Write a note on Wagner's earth connection. (04 Marks)

**Module-5**

- 9 a. What are the factors to be considered for the selection of better transducer? (04 Marks)  
b. Derive an expression for gauge factor for Bonded Resistance wire strain Gauges. (08 Marks)  
c. Mention advantages and limitation of thermistor. (04 Marks)

OR

- 10 a. Explain the construction, principle and operation of LVDT. Show characteristics curve. (10 Marks)  
b. Explain Piezoelectric Transducer. (06 Marks)

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