

CBCS SCHEME

17EC32

Third Semester B.E. Degree Examination, July/August 2021 Electronic Instrumentation

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

1.
 - a. Define significant figure, accuracy and system error. (06 Marks)
 - b. A component manufacturer constructs certain resistors to be anywhere between 1.14 K Ω and 1.26 K Ω and classifies them as 1.2 K Ω resistors. What tolerance should be stated? If the resistance values are specified at 25°C and the resistors have a temperature coefficient of +500 ppm/°C. Calculate the maximum resistance of one of these components at 75°C. (08 Marks)
 - c. Mention the requirements of shunt. Explain different types of thermocouples. (06 Marks)
2.
 - a. Find the voltage reading and % error of each reading obtained with a voltmeter on (i) 5V range (ii) 10V range (iii) 30V range, if the instrument has a 20 K Ω /V sensitivity and is connected across R_b of Fig.Q2(a).

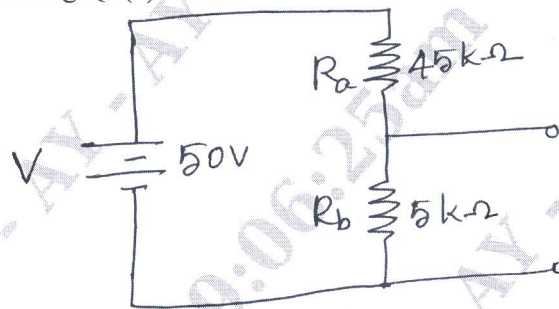


Fig.Q2(a)

(10 Marks)

- b. Calculate the value of the multiplier resistor for 10V range on the voltmeter shown in Fig.Q2(b).

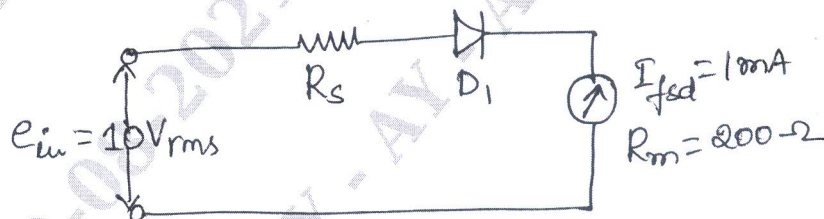


Fig.Q2(b)

(05 Marks)

- c. Explain the operation of True rms voltmeter. (05 Marks)
3.
 - a. Explain successive approximation DVM with suitable diagrams. (10 Marks)
 - b. What is the resolution of a 3½ digit display on 1V and 10V ranges? (05 Marks)
 - c. An integrator consists of 100 K Ω and 2 μ F capacitor. If the applied voltage is 2V, what will be the output of the integrator after 2 seconds. (05 Marks)
 4.
 - a. Explain with block diagram digital frequency meter. (10 Marks)
 - b. Discuss the functioning of Digital Tachometer and Digital Capacitance meter. (10 Marks)

- 5 a. Describe the measurement of frequency by Lissajous method. (08 Marks)
 b. Draw Basic CRO block diagram. Explain functionality of each block. (08 Marks)
 c. Mention the CRT features. (04 Marks)
- 6 a. Explain function generator with suitable block diagram. (10 Marks)
 b. Discuss modern laboratory type signal generator. (10 Marks)
- 7 a. Which is the device/instrument used to measure electrical properties of coils and capacitors? Explain circuit diagram and its functionality. (10 Marks)
 b. Explain field strength meter with suitable circuit diagrams. (10 Marks)
- 8 a. An unbalanced Wheatstone bridge is given in Fig.Q8(a). Calculate the current through the galvanometer.

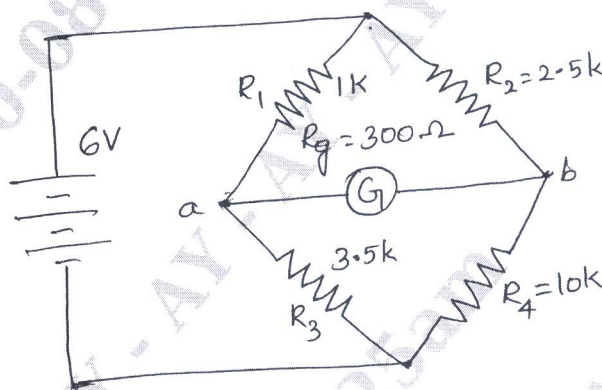


Fig.Q8(a)

- (08 Marks)
- b. Derive an equation for R_x and C_x in capacitance comparison bridge. (08 Marks)
 c. A Maxwell bridge is used to measure an inductive impedance. The bridge constants at balance are $C_1 = 0.01 \mu\text{F}$, $R_1 = 470 \text{ K}\Omega$, $R_2 = 5.1 \text{ K}\Omega$ and $R_3 = 100 \text{ K}\Omega$. Find the series equivalent of the unknown impedance. (04 Marks)
- 9 a. What are the factors to be considered while selecting transducer? (06 Marks)
 b. Derive an expression for Gauge factor in bonded resistance wire strain gauge. (10 Marks)
 c. Give advantages and limitations of thermistor. (04 Marks)
- 10 a. Explain the construction and working of LVDT. (10 Marks)
 b. Write a short note on piezo electrical and photo transistor transducers. (10 Marks)
