

Q.2 a. Discuss Limiting errors and relative limiting errors.

Answer: Article 3.1-3.2 of Text Book 1

b. A voltage has a true value of 1.50V. An analog indicating instrument with a scale range of 2.50V shows a voltage of 1.46 V.

(i) What are the values of absolute error and correction?

(ii) What is the error as a function of the true value and as a % of full scale deflection?

Answer:

b- Absolute error
 $SA = A_m - A_t = 1.46 - 1.50 = -0.04 \text{ V}$
 Absolute correction
 $SC = -SA = +0.04 \text{ V}$
 Relative error (ϵ_r) = $\frac{SA}{A_t} = \frac{-0.04}{1.50} \times 100$
 $= -2.67\%$
 Relative error as a % of f.s.d.
 $= \frac{-0.04}{2.5} \times 100 = -1.60\%$

Q.3 a. What are the various methods used to measure medium resistance?

Explain anyone method in brief.

Answer: Article 14.2/14.2.4 of Text Book 1

b. Explain working of Anderson's bridge with the help of phasor diagram.

Also derive the relation for self inductance of a coil.

Answer: Article 16.5.4 of Text Book 1

Q.4 a. What are the general requirements of a shunt?

Answer: Article 3.1, Page Number 65 of Text Book 2

b. A 100 μA meter movement with an internal resistance of 500 Ω is to be used in a 0-100 mA Ammeter. Find the value of the required shunt.

Answer:

here $I = n I_m$
 $R_{sh} = \frac{I_m R_m}{I - I_m} = \frac{I_m R_m}{n I_m - I_m}$
 $= \frac{R_m}{n - 1}$
 $n = \frac{I}{I_m} = \frac{100 \text{ mA}}{100 \mu\text{A}} = 1000$
 $R_{sh} = \frac{R_m}{n - 1} = \frac{500}{1000 - 1}$
 $= \frac{500}{999} \text{ ohm}$

c. Explain working of AC voltmeter using rectifiers.

Answer: Article 4.12, Page Number 99 of Text Book 2

Q.5 a. Discuss the working principle and applications of the following:
(i) Universal counter

Answer: Article 6.5, Page Number 158 of Text Book 2

(ii) Voltage to frequency conversion using integrating type DVM.

Answer: Article 5.4, Page Number 132 of Text Book 2

b. Write the working principle and applications of Q meter.

Answer: Article 10.7, Page Number 286 of Text Book 2

Q.6 Explain the working of the following using block diagram.

(i) VHF sampling oscilloscope

Answer: Article 7.17, Page Number 201 of Text Book 2

(ii) Standard Signal Generator

Answer: Page Number 222 of Text Book 2

Q.7 a. Draw the block diagram of Spectrum Analyser and explain its working.

Answer: Page Number 254 of Text Book 2

b. Explain in brief Self Balancing Bolometer Bridge with the help of a diagram.

Answer: Page Number 692 of Text Book 2

Q.8 Discuss working principle of the following and write their applications.

(i) Magnetic Recorders

Answer: Article 12.7, Page Number 385 of Text Book 2

(ii) Galvanometer type Recorder

Answer: Article 12.3, Page Number 374 of Text Book 2

Q.9 a. Write applications of the following

(i) Differential output transducer

(ii) Capacitive transducer

(iii) Strain Gauges

(iv) Resistive transducers

Answer: Page Number 402 of Text Book 2

b. Explain single channel Data Acquisition System (DAS) in brief.

Answer: Page Number 600 of Text Book 2

TEXT BOOKS

1. A Course in Electrical and Electronic Measurements and Instrumentation, A.K Sawhney, Dhanpat Rai & Co., New Delhi, 18th Edition 2007.

2. Electronic Instrumentation, H.S Kalsi, Tata McGraw Hill, Second Edition 2004.