

Que 2 Short Questions (Attempt Any Ten)

[20]

- 1 State the two conditions that must be satisfied to obtain AC bridge balance.
- 2 AC bridge has four arms. The values are:
 $Z_1=100\angle 80^\circ$ (inductive arm), $Z_2=250$ (resistive arm), $Z_3=400\angle 30^\circ$ (inductive arm), Find value of Z_4 and comment on it.
- 3 Enlist limitations of Wheatstone's bridge.
- 4 Enlist drawbacks of resistive network.
- 5 For a 5 bit ladder, if the input levels are $0=0$ V and $1=+10$ V. What are the output voltages for each bit?
- 6 State the use of DAC and ADC.
- 7 A set of independent voltage measurements taken by four observers was recorded as 117.02 V, 117.11 V, 117.08 V and 117.03 V. Calculate (a) the average voltage; (b) the range of error.
- 8 Explain types of errors.
- 9 Define: Instrument and Error.
- 10 Draw the block diagram of typical op-amp.
- 11 An op-amp gives a peak of sinusoidal output $V_0=V_{\max}\sin\omega t$ volts. Determine its slew rate for maximum swing.
- 12 Determine the frequency at which highest unclipped output can be obtained from the given op-amp.

Que 3 [A] Define: arithmetic mean, deviation from the mean and average deviation. [10]

A set of independent current measurements was taken by six observers and recorded as 12.8 mA, 12.2 mA, 12.5 mA, 13.1 mA, 12.9 mA and 12.4 mA. Calculate (a) the arithmetic mean; (b) the deviation from the mean and average deviation.

OR

[B] Write on limiting errors. [05]

[C] Explain probability of errors. [05]

Que 4 [A] Derive an expression for the closed loop voltage gain for non-inverting amplifier. [05]

[B] Write a detailed note on differentiator using op-amp. [05]

OR

[C] Derive an expression for the closed loop voltage gain for an inverting amplifier. [05]

[D] Write a detailed note on integrator using op-amp. [05]

Que 5 [A] Obtain balance conditions for Maxwell's bridge with necessary circuit diagram. Enlist limitation of a Maxwell's bridge. [10]

OR

[B] Draw the circuit diagram and obtain balance conditions for Schering's bridge. Explain how power factor and dissipation factor of a capacitor can be measured. [10]

Que 6 [A] Explain D/A converter with binary-weighted resistors. [05]

[B] Discuss digital-to-analog converter using op-amp. [05]

OR

[C] Write a note on Binary ladder. [05]

[D] Discuss successive-approximation A/D converter. [05]

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