

- 1 (a) The stress in a mild steel plate circular diaphragm is given by

$$\delta = \frac{3D^2P}{16t^2} \text{ N/m}^2$$

where D = diameter of diaphragm, m

t = thickness of diaphragm, m

P = applied pressure, N/m²

A diaphragm has a diameter of 15 mm and thickness of 0.2 mm and the applied pressure is $300 \times 10^3 \text{ N/m}^2$. Calculate the stress. The known error in diameter is 1% and in thickness is 3%. Calculate the error in stress.

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- (b) Define the following terms :

(1) Accuracy

(2) Precision.

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UNIT - II

- 2 (a) Explain the true r.m.s. responding a.c. voltmeter with the suitable block diagram.

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- (b) In a dual slope integrating DVM, the reference voltage is 100 mV and the first integrating period is set as 50 ms. The input resistor of the integrator is 100 k Ω and the integrating capacitor 0.047 μF . For an input voltage of 120 mV, determine the second integration (de-integration) period.

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OR

- 2 (a) An ideal diode has been connected across a 10 Ω , 100 mA, centre-zero PMMC meter as shown in figure 2 (a). Determine the reading of meter.

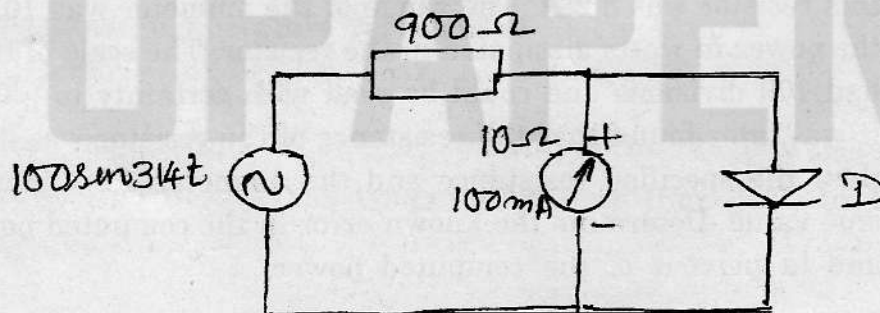


Fig. 2(a)

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(b) Explain the vector impedance meter with the neat diagram.

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UNIT - III

3 (a) How can the following quantity be measured using CRO ?

- (1) Current
- (2) Frequency
- (3) Phase angle
- (4) Voltage.

(b) Explain the dual beam oscilloscope.

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OR

3 (a) Compare the digital storage oscilloscope and analog storage oscilloscope.

(b) What value should C_1 have for V_o to be equal to $0.1 V_i$ in circuit shown below ?

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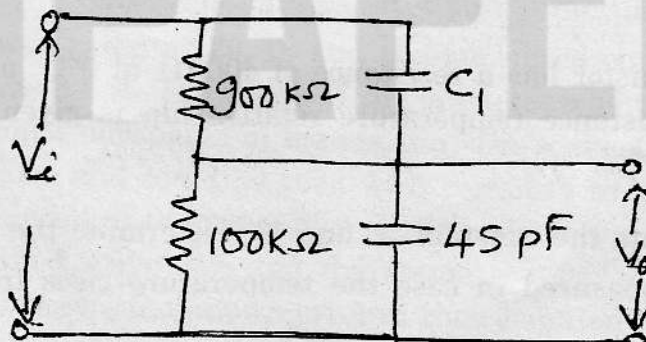


Fig. 3(b)

UNIT - IV

4 Explain all kind of attenuators used in signal generators.

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OR

4 (a) What is the frequency synthesized signal generator ? Explain direct analog synthesizer.

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(b) Draw the block diagram and explain the working of a random noise generator.

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UNIT - V

5 (a) An accelerator has a damping ratio of 0.7. Calculate the value of frequency ratio so that ratio of steady relative displacement to amplitude of input displacement is 0.99 (i.e. the error is 1%)

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(b) Explain the loading effect and frequency response of piezoelectric transducer.

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OR

5 (a) Derive an expressions for the gauge factor of strain gauges. Give its applications and working principle in detail.

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(b) A thermistor has a resistance of $4000\ \Omega$ at 0°C and $800\ \Omega$ at 40°C . The resistance temperature relationship is given by

$$R_1 = R_0 \alpha e^{\beta/T}$$

determine the constant α and β . Determine the range of resistance to be measured in case the temperature rises from 50°C to 100°C .

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