[This question paper contains 4 printed pages.]

**Sr. No. of Question Paper : 6462** **D** **Your Roll No.....**

Unique Paper Code : 251505

Name of the Course : **B.Sc. (H) Electronics**

Name of the Paper : ELHT-503, Electronics Instrumentation

Semester : V

Duration : 3 Hours Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. 1 is compulsory
2. Attempt **Five** questions in all.
3. **All** questions carry equal marks.
4. Nonprogrammable scientific calculators are allowed.

1. Answer any **FIVE** in brief :

   (a) Differentiate Accuracy and Precision.

   (b) Define working principle for a current probe.

   (c) How intensity, focus and Time/div controls of the CRO front panel should be used to control the damage of the CRT screen ?

   (d) What is the difference between active and passive transducer ? Give an example of each.

   (e) Define a pulse with respect to the duty cycle. How is duty cycle varied and controlled in a pulse generator ?

   (f) What is the basic principle of piezoelectric transducer ? (3×5)

*P.T.O.*

2. (a) Calculate the average and standard deviation of the following data.

(i) $x_1 = 69.7$ (ii) $x_2 = 70.1$

(iii) $x_3 = 70.2$ (iv) $x_4 = 69.6$ and

(v) $x_5 = 69.7$ (4)

(b) Discuss the working principle of dual slope integrating type digital voltmeter with the help of a block diagram. (5)

(c) A series type ohm meter requires a 1 mA for full scale deflection and has an internal resistance of 150Ω. The internal battery used has a voltage of 5 V. the desired values of half scale deflection is 2000Ω. Calculate :

(i) Values of $R_1$ and $R_2$.

(ii) Keeping $R_1$ as calculated in (i) find the range of $R_2$ if battery voltage varies from 4.8 V to 5.1V. (6)

3. (a) Explain how Q-meter is used to measure high impedance components. (5)

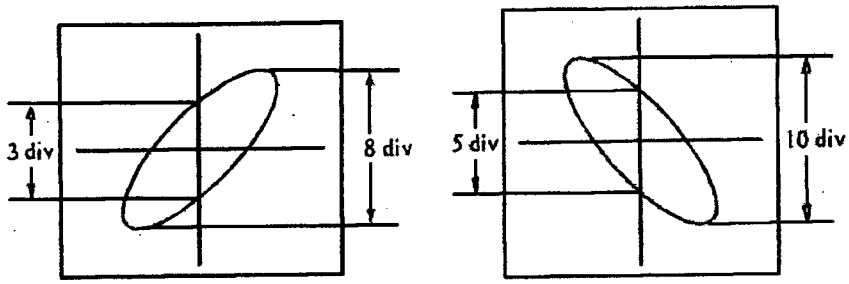
(b) Explain the working principle of a frequency meter in Frequency and Time mode. (5)

(c) A 1mA meter movement having an internal resistance of 100 Ω is used to convert into a multirange ammeter having the range 0-10 mA, 0-20 mA and 0-50 mA. Determine the value of the shunt resistance required. (5)

4. (a) What is the purpose of sweep synchronization in CRO. How is it achieved ? (5)

(b) How does sampling CRO increase the apparent frequency response of an oscilloscope ? (7)

(c) Assume that the patterns shown in the figures below appear on an oscilloscope screen. Calculate the phase angle θ in each case. (3)




5. (a) Give advantages of shielded cables and their limitations. (5)

(b) Explain with diagram how CRO can be used to measure capacitance. (3)

(c) State the working principle of a spectrum analyzer. (7)

6. (a) Explain with the help of block diagram AF sine-Square wave audio oscillator. State the various controls on the front panel of a sine and square wave generator. (7)

(b) How can one use a transmitter and a receiver combination to calculate the speed of a fan ? (4)

(c) Define Gauge factor. A resistance strain gauge with a K=2, mounted on a steel plate under a strain of 1.0E-6. Calculate the change in resistance with the original resistance of the gauge is 130 Ω. (4)

7. (a) Explain construction and working principle or a LVDT. Where it is used ? (6)

(b) An ac LVDT has an output of 5.2V for a corresponding input of 6.3V, for a range of ±0.5". Determine

(i) The output voltage vs core position for a variation of core movement from +0.45" to –0.30".

(ii) The corresponding output voltage when the core is –0.25" w.r.t. the reference. (3)

(c) Explain construction and working principle of a PRT. (6)