Sl. No. Of Ques. Paper :   **8336C**
Unique Paper Code   :   **222361**
Name of the Paper   :   **ELPT-303 : Electronic Instrumentation**
Name of the Course   :   **B.Sc. Applied Physical Sciences Part II (Electronics)**
Semester   :   **III**
Duration   :   **3 hours**
Maximum Marks   :   **75**

Attempt five questions, Question No. 1 is compulsory.

Q1.   Attempt any five questions.   **3 x 5**

     (a)   When does the need of post-deflection accelerator arise in CRO? What is its advantage?

     (b)   What are the factors on which the luminance of CRO screen depends?

     (c)   Explain the loading effect of a voltmeter.

     (d)   Draw the Lissajous patterns when horizontal signal frequency is twice the vertical signal frequency and *vice versa*.

     (e)   Determine the resistance value required to use a 0-1 mA meter with an internal resistance of 100 Ω for a 0-1 V voltmeter.

     (f)   What precautions should be observed when using an ammeter for measurement work?

     (g)   Why is the delay line used in the vertical section of an oscilloscope?

     (h)   Define luminance, fluorescence and phosphorescence.

Q 2.   **(a)**   Give the expression for torque in a permanent magnet moving coil   **7½**
                galvanometer and explain the various terms.

                Calculate the torque in a moving coil galvanometer with the various parameters
                having the under-mentioned values (the symbols have the usual meaning) :
                $A = 1.75 \text{ cm}^2$, $B = 2.0$ gauss (0.2 tesla), $N = 84$ turns with full scale current of 1 mA.

     (b)   Draw the circuit diagram for an Ayrton shunt to convert a milliammeter having   **7½**
                full scale deflection of 1 mA and an internal resistance of 50 ohms to cover the
                current ranges of 1 A, 5 A and 10 A and calculate the values of shunt resistance.

Q 3.   **(a)**   Give detailed theory of series type ohmmeter. What are its disadvantages   **7½**
                and how can they be rectified?

     (b)   A series type ohmmeter uses 50 Ω basic movement requiring full scale current   **7½**
                of 1 mA. The internal battery voltage is 3 V. The desired scale marking for half
                scale deflection is 2000 Ω. Calculate the values of R_1 and R_2 where R_1 is the
                current limiting resistor and R_2 is zero adjust resistor.

Q4.   **(a)**   Draw the circuit diagram of amplified DC voltmeter with FET input and   **7½**
                also draw amplified voltage and current meter. Briefly explain their working.

     (b)   Explain the working of ramp type DVM in detail with help of diagram.   **7½**

Q5.   Draw the block diagram of general purpose oscilloscope and also show the   15
                     equipotential surfaces for electrostatic focusing. Draw the circuit diagram
                     showing the generation of applied voltages on various electrodes in the CRO.

Q6.   (a)   Explain in detail the function of delay line in CRO with the help of a diagram.   7½

       (b)   Draw the block diagram of vertical deflection system of an oscilloscope.   7½
             How is the combination of capacitive and resistive voltage divider used as
             compensated attenuator?

Q7.   (a)   Draw the block diagram of sweep frequency generator and explain its working.   7½

       (b)   Give the circuit diagram of free running astable multivibrator and obtain the   7½
             expressions for the on-time and off-time.