This question paper contains 4 printed pages.]

Your Roll No. .....

1402

B.Sc. (Hons.) / II A

ELECTRONIC SCIENCE – Paper 2.4 (XI)

(Instrumentation)

Time : 3 Hours **Maximum Marks : 38**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt **five** questions in all, including Question No. **1**, which is compulsory.

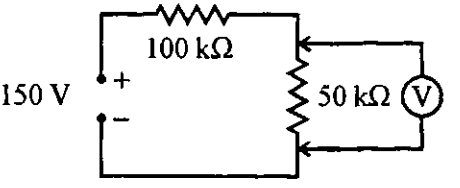
1. (a) In a CRO, why and where are delay lines used ? **2**

   (b) What are the characteristics of a regulated power supply ? **2**

   (c) What is the difference between a square wave generator and a pulse generator ? **2**

   (d) What is Wagner ground connection ? Where is it used ? **2**

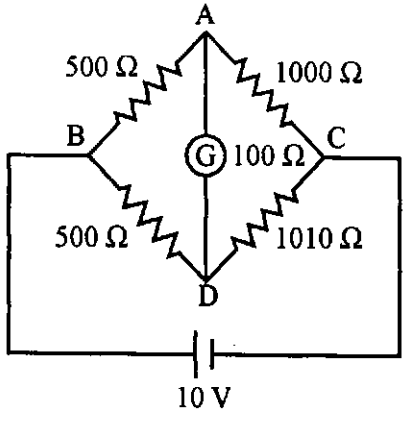
(e) It is desired to measure the voltage across the 50 kΩ resistor in the given circuit. Two voltmeters are available for this measurement : Voltmeter 1 with a sensitivity of 1,000 Ω/V and Voltmeter 2 with a sensitivity of 20,000 Ω/V. Both meters are used on their 50 V range. Calculate the reading of each meter. 2



2. (a) Draw the block diagram of a general purpose CRO briefly explaining function of each block. 4

(b) Draw Lissajous patterns (i) when a 3 KHz frequency signal is connected to vertical and 2 KHz frequency signal is connected to horizontal deflection plates (ii) when a 3 KHz frequency signal is connected to vertical and 5 KHz frequency signal is connected to horizontal deflection plates. 3

3. (a) If the sensitivity of galvanometer in the given circuit is 10 mm/μA, determine its deflection. 4



(b) How is Hay bridge different from Maxwell bridge ? How do you use it for measuring high Q coils ? 3

4. (a) How will you measure the Q of low impedance components ? 4

(b) A coil with a resistance of 10 Ω is connected in the "direct measurement" mode of a Q meter. Resonance occurs when the oscillator frequency is 1 MHz and the resonating capacitor set at 65 pf. Find the percentage error introduced in the calculated value of Q by the 0.02 Ω insertion resistance. 3

5. (a) Give the elements of a standard signal generator. How is it different from a function generator ? 4

(b) Explain the working of Staircase-ramp Digital Voltmeter. 3

6. (a) Explain period and ratio measurement mode of Universal Counter. 4

(b) Suggest three ways in which you can obtain maximum accuracy in a universal counter. 3

7. (a) Explain the working of IC723 as voltage regulator. 4

(b) How are shunt regulators different from series regulators ? 3
