o. Roll No. Total No. of Pages : 3

BT–4/J08 8663

Electronics Instrumentation and Measurements

Paper—ECE-202 E

Option—II

Time : Three Hours] [Maximum Marks : 100

Note :— Attempt any **FIVE** questions, selecting at least **ONE** question from each unit.

UNIT—I

1. Explain each of the following :—
   (i) Gross error
   (ii) Determination of maximum systematic error
   (iii) Normal law of error
   (iv) Probable error. 4×5=20

2. (a) A four terminal resistance of approximately 50 μΩ was measured with the help of Kelvin double bridge under the following conditions :—
   Value of standard resistance = 100·03 μΩ
   Resistance of inner ratio/arms = 100·31 Ω and 200·00 Ω
   Resistance of outer ratio/arms = 100·24 Ω and 200·00 Ω
   Value of low resistance link = 700 μΩ.
   Calculate the magnitude of error in the measurement. 8

   (b) Describe Carey Foster's slide wire bridge for measurement of medium resistance. 7

   (c) Explain why Kelvin's double bridge is superior to Wheatstone bridge for the purpose of low resistance measurement. 5

UNIT—II

3. (a) Describe how Schering bridge can be used for measurement of an unknown capacitance and its loss angle ? Derive the conditions for balance and draw the phasor diagram of the bridge circuit under conditions of balance. 12

(b) Show that the Wein frequency bridge will be balanced at only one frequency given by :

$$F = \frac{1}{2\pi\sqrt{C_1C_2R_1R_2}} \text{ Hz},$$

where C_1, C_2, R_1, R_2 have their usual meanings. Draw the phasor diagram at this particular frequency. 8

4. (a) What are the main features to be considered for making choice of a particular galvanometer ? 10

(b) What is the difference between CRT and CRO ? Draw a neat block diagram of a general purpose CRO and explain functions of each block. 10

UNIT—III

5. Discuss the working of the following :—

(i) Wage Analyzer

(ii) Distortion Meter. 10×2=20

6. (a) In what respect LCD displays are advantageous over LED displays ? Explain in detail. 10

(b) Explain the principle of frequency measurement using digital techniques. 10

UNIT—IV

7. (a) What is Piezoelectric effect ? Why this effect is only possible in crystals having asymmetrical charge distribution ? Explain.

Give merits, demerits and applications of Piezolectric transducer. 15

(b) Write a technical note on strain gauge. 5

8. Write a short note on each of the following :—

(i) R-2R D/A Converter

(ii) Time Division Multiplexing

(iii) Telemetry

(iv) Acquisition Systems. 20