TEC-303   1077

Odd Semester Examination 2018-19

B.TECH. (EEE/EN) (SEMESTER-III)

ELECTRONICS INSTRUMENTATION AND

MEASUREMENTS

Time: 03:00 Hours   **Max Marks :100**

Note:Attempt all questions. All questions carry equal marks.

1.   Attempt **any four** parts: [4x5=20]

(a)   Explain the measurement errors

(i)   Gross Errors

(ii)   Systematicerrors

(iii)   Random Errors.

(b)   What is drift? Explain the different types of drifts with sketches of input-output relationships in each case

(c)   The true value of voltage across a resistor is 50V. The measurement finds a value of 49V. Calculate

(i)   the absolute error

(ii)   the percent error and

(iii)   thepercent accuracy.

(d)   Sketch the circuit of a multi-range shunt ohmmeter. Explain the circuit operation

(e)   A PPMC instrument has FSD of 100µA and a coil resistance of 1K. Calculate the required resistance value to convert it into an ammeter with (i) FSD= 100mA and (ii) FSD= 1A

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2. Attempt **any four** parts: [4x5=20]

(a) Draw and explain AC Electronic Voltmeter and compare it with digital voltmeter.

(b) Describe in DFM (Digital Frequency Meter)and how we measure frequency with the help of DFM?

(c) A Wheatstone bridge has P= 3.5kΩ, Q=7k Ω and Galvanometer nullis obtained when S= 5.51k Ω.

    (i) Find R

    (ii) Determine the range of bridge if S is adjustable from 1kΩ to 8k Ω

(d) Give the circuit diagram for a dual slope type A/D converter and states its advantages.

(e) Explain the compensation for inductance of pressure coil in electrodynamometer type wattmeter.

3. Attempt **any two** parts: [2x10=20]

(a) An Owen bridge used to measure the properties of a sample of sheet at2KHz. At balance, arm AB is the test specimen; arm BC is R_2 = 100 Ω; arm CD is C_4= 0.1μF and arm DA is R_3= 834 Ω in series with C_3= 0.124μF. Detector is connected between pints B and D and a.csupply is connected between A and C. Calculate the effectiveimpedance of the inductive specimen under test conditions.

(b) Explain the working principle of Schering Bridge. Discuss it advantages and disadvantages.

(c) Explain how Maxwell's inductance capacitance bridge is used for measurement of inductance of a coil. Derive the mathematical relationship for unknown inductance and Q factor of the coil in terms of other known parameter of the bridge.

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4. Attempt **any two** parts: [2x10=20]

(a) Describe the working of an integrating type digital voltmeter. Explain the functioning of a potentiometric type digital voltmeter.

(b) What is Dual trace Oscilloscope? What are its types? Which type of dual trace oscilloscope is used for the high frequency signal trace?

(c) Explain the following terms as applied to digital displays:

   (i) Resolution

   (ii) Sensitivity of digital meters

   (iii) Difference between $3\frac{1}{2}$ digit and 4 digit displays

   (iv) Accuracy specification of digital meters.

5. Attempt **any two** parts: [2x10=20]

(a) Write short note on concept of ECG, EMI, and EEG. What is the use of Recorders; explain the working of XY recorder.

(b) Draw and explain the circuit of Sine Wave Generator. Describe the working of a sweep frequency generator. What are the sweeper errors?

(c) Describe how the frequency and phase angle measurements can bemade with the use of a CRO. The Lissajous pattern obtained onCRO screen is shown in fig.1; sending data character 'Z' to the LCD.
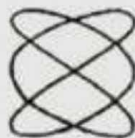

Fig.1

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