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18EE36

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Electrical and Electronic Measurements

Time: 3 hrs.
Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. Define 'Voltage Sensitivity' of a Galvanometer. Obtain an expression for bridge sensitivity S_b in terms of voltage sensitivity and bridge parameters. When will the bridge sensitivity be maximum? **(07 Marks)**

b. Explain the necessity of Earthing. Explain measurement of Earth Resistance by fall of potential method. **(06 Marks)**

c. Explain Maxwell Inductance capacitance bridge and derive its balance equation. **(07 Marks)**

OR

2   a. Explain the significance of 'low resistance' measurement. With a neat circuit diagram, explain Kelvin Double Bridge and derive its balance equation. **(08 Marks)**

b. The four arms of an ac bridge have impedance values of $Z_1 = 400\underline{|50°}$ ohm, $Z_2 = 200\underline{|40°}$ ohm, $Z_3 = 800\underline{|-50°}$ ohm and $Z_4 = 400\underline{|20°}$ ohm. Find whether the bridge is balanced under this working condition. **(04 Marks)**

c. With a neat circuit diagram, explain modified De-Sauty bridge for measurement of capacitance of an imperfect capacitor and derive its balance equation. **(08 Marks)**

Module-2

3   a. Derive the torque equation of a single phase Dynamometer type Wattmeter. **(07 Marks)**

b. Explain the various adjustments required in Energy meter for the accurate reading. **(06 Marks)**

c. With a neat sketch, explain the construction and working of a single phase Dynamometer type Power Factor meter. **(07 Marks)**

OR

4   a. Explain: i) Phase sequence Indicators   ii) Determination of power factor of a balanced three phase load, using Wattmeter readings W_1 and W_2 obtained from two Wattmeter method of power measurement. **(08 Marks)**

b. Explain the various errors and adjustments in Dynamometer type Wattmeter. **(06 Marks)**

c. With a neat sketch, explain the construction and working of Weston frequency meter. **(06 Marks)**

Module-3

5   a. What are shunts and multipliers? Derive expressions to find the required values of shunts and multipliers. **(06 Marks)**

b. What are Instrument Transformers? Differentiate between Current Transformers and Power Transformers. **(06 Marks)**

c. Explain the current transformer with the help of an equivalent circuit diagram and a phasor diagram, write expressions for 'ratio error' and 'phase angle error' of a CT. **(08 Marks)**

OR

6 a. Explain what is meant by testing of Instrument Transformers, with a neat circuit diagram explain silsbee's method of testing CT. (06 Marks)
   b. State the advantages and disadvantages of using Instrument transformers. (06 Marks)
   c. Describe experimental method of measurement of flux density in a Ring specimen of magnetic material using ballistic galvanometer. (08 Marks)

Module-4

7 a. What are the advantages of electronic instruments? (04 Marks)
   b. Explain the construction and working principle of a true RMS Reading Voltmeter. (08 Marks)
   c. Explain the construction and working of a RAMP type digital voltmeter. (08 Marks)

OR

8 a. Explain, what are Q meters? (04 Marks)
   b. Explain the construction and working of a successive approximation type DVM. (08 Marks)
   c. Explain the principle and working of an electronic energy meter with a block diagram. What are the advantages of electronic energy meters over conventional Electromechanical Energy Meters? (08 Marks)

Module-5

9 a. Explain with suitable sketch, working of a Cathode Ray Tube (CRT). (06 Marks)
   b. Explain the principle and operation of (i) Strip chart recorders (ii) Galvanometer recorders. (08 Marks)
   c. Write a note on Display Devices. (06 Marks)

OR

10 a. Explain with a neat sketch ECG recorders? (08 Marks)
   b. Write notes on: i) LEDs ii) LCDs. (06 Marks)
   c. Explain what are: i) Nixes ii) Liquid Vapour Devices. (06 Marks)

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