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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