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17EE36

**Third Semester B.E Degree Examination
Electrical and Electronic measurements**

Time:3 hrs.

Max.marks 100

Note: Answer FIVE full questions, choosing one full question from each module

Module-1

- a.** With a neat sketch, explain Kelvin double bridge. Obtain an expression for balancing condition. **(12 marks)**

b. Explain the fall of potential method for earth resistance measurement. **(8Marks)**

OR

- a.** In an Anderson's bridge for measurement of inductance, the arm AB consists of an unknown inductance of L and resistance R , a known variable resistance in arm BC, fixed resistance of 600Ω in arms CD and DA, a known variable resistance in arm DE and a condenser with fixed capacitance of $1\mu F$ in arm CE. The supply with frequency 100Hz is connected across AC and detector is between B and E. If the balance is obtained with a resistance of 400Ω in arm DE and resistance of 800Ω in arm BC. Determine the values of L and R . **(5Marks)**

b. Obtain the balance equation for Maxwell's Inductance-capacitance bridge used for measurement of unknown inductance. Draw the phasor diagram at balance condition. **(10 Marks)**

c. Mention the applications and limitations of Wheatstone bridge **(5Marks)**

Module-2

- a.** Derive the torque equation of single phase electro-dynamometer type wattmeter. **(08Marks)**

b. With a neat sketch, explain the operation of Weston frequency meter. **(06Marks)**

c. Explain the special features of LPF dynamometer type wattmeter. **(06 Marks)**

OR

- a.** With a neat sketch explain the construction and working of electro-dynamometer type single phase power factor meter. **(08 Marks)**

b. The name plate details of 1-ph kWh meter reads as 250 V, 20A, 1800 rev/kwh. The meter is tested at 0.75% of load at UPF. The meter makes 20 revolutions in 10 sec. Find the % error in reading of energy meter. **(04 Marks)**

c. With a neat sketch explain three phase reactive power measurement. **(08Marks)**

Module-3

- a.** What do you mean by shunts and multipliers and derive the expression for shunt and multipliers. **(10 Marks)**

b. Explain the operation of the comparative deflection method of testing a current transformer by silsbee's method. **(10 Marks)**

OR

- a.** A current transformer with a bar primary has 300 turns in its secondary winding. The resistance and reactance of the secondary circuit are 1.5Ω and 1Ω respectively including transformer winding with 5A current flowing in secondary winding. The

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magnetizing mmf is 100A and Iron loss is 1.2W. Determine ratio and phase angle errors. **(12 Marks)**

b. Explain the measurement of magnetizing force by ballistic galvanometer and a search coil with a neat diagram. **(8 Marks)**

Module-4

7. **a.** With a block diagram representation, explain the working principle of electronic energy meters. **(5Marks)**

b. With a block diagram, explain the ramp-type digital voltmeters **(10 Marks)**

c. Calculate the value of self capacitance if the measurement results are, $f_1 = 2\text{MHz}$ and $C_1 = 500\text{pF}$. When the second frequency is 2.5 times f_1 , the tuning capacitor is 60pF . **(5 Marks)**

OR

8. **a.** List out the advantages of electronic instruments over conventional analog meters. **(4 Marks)**

b. With a neat diagram, explain the working of an electronic multimeter **(8 Marks)**

c. With a neat diagram, explain the working of successive approximate type of digital voltmeter **(8 Marks)**

Module-5

9. **a.** With a neat sketch, Explain the working of strip chart recorder **(10Marks)**

b. Explain Bar graph displays and cold cathode displays or Nixie tube. **(10 Marks)**

OR

10. **a.** With neat block diagram explain XY- recorders. **(10 Marks)**

b. With neat block diagram explain ultraviolet Recorder. **(10 Marks)**