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18EE36

## Third Semester B.E. Degree Examination, July/August 2021 Electrical and Electronic Measurements

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions.**

- 1
  - a. Derive an expression for the unknown inductance under balanced condition using Hay's bridge. Draw the phasor diagram. (08 Marks)
  - b. With necessary circuit diagram deduce an expression for sensitivity of the Whetstone's bridge. Mention the limitation of Whetstones bridge. (08 Marks)
  - c. Discuss on the advantages of Maxwell's inductance capacitance bridge. (04 Marks)
  
- 2
  - a. Derive an expression for unknown capacitance under balance condition using low voltage Schering bridge. Draw the phasor diagram for the bridge under balanced condition. (08 Marks)
  - b. With neat diagram derive the balancing equation for Kelvin's double bridge. (07 Marks)
  - c. Explain the fall of potential method for earth resistance measurement. (05 Marks)
  
- 3
  - a. A Wattmeter has current coil and pressure coil resistance of  $0.3\Omega$  and  $4500\Omega$  respectively. The load derives a current of  $15A$  at  $250V$  with  $0.8$  pf lag. Evaluate the percentage error in the wattmeter reading when i) Pressure coil is connected on supply side ii) Current coil is connected on supply side. (05 Marks)
  - b. With a neat sketch explain the three phase reactive power measurement by two wattmeter method. (08 Marks)
  - c. With a neat diagram explain with working of Weston frequency meters. (07 Marks)
  
- 4
  - a. A  $230V$  single phase energy meter has a constant load of  $5A$  passing through it for 7 hours at  $0.85$  pf lag. If the meter disc revolves 2300 revolution during this period. What is the energy meter constant in terms of revolution/kwh. Calculate the power factor of the load if the number of revolution made by the meter are 1432 revolutions when operating at  $235V$ ,  $6A$  for 5 hours. (05 Marks)
  - b. Explain the working principle and construction of single phase electro dynamometer powerfactor meter with a neat diagram. (08 Marks)
  - c. Explain the special features incorporated in an electro dynamometer type of wattmeter so that it can be used for low power factor application. (07 Marks)
  
- 5
  - a. Explain the operation of comparative deflection method of testing a current transformer by Silsbee's method. (08 Marks)
  - b. A moving coil meter gives fullscale deflection with a current of  $5mA$ . If the coil of the instrument has a resistance of  $10\Omega$ , how it can be adopted to work as
    - i) Ammeter of range  $0-10A$
    - ii) Voltmeter of rang  $0-10V$ . (05 Marks)
  - c. With a neat diagram, explain the measurement of magnetizing force (H). (07 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg,  $42+8=50$ , will be treated as malpractice.

- 6 a. What do you mean by shunts and multipliers, derive the expression for shunt and multiplier. (07 Marks)  
b. Explain the method to measure flux using Ballistic galvanometer with a neat sketch. (08 Marks)  
c. Explain the measurement of leakage factor using search coil. (05 Marks)
- 7 a. With a block diagram, explain the operation of successive approximation type of digital voltmeter. (08 Marks)  
b. Using a block diagram schematic, explain the loading of electronic energy meter. (08 Marks)  
c. List the advantages of electronic voltmeter. (04 Marks)
- 8 a. With a block diagram, explain the operation of true R.M.S responding voltmeter. (08 Marks)  
b. Describe the working principle of Q meter with a circuit diagram. (08 Marks)  
c. List the advantages of electronic energy meter. (04 Marks)
- 9 a. With a diagram, explain the operation of X-Y recorders. (08 Marks)  
b. With a diagram, explain the working of LCD display. (07 Marks)  
c. With a block diagram, explain the operation of circular chart recorder. (05 Marks)
- 10 a. With a diagram, explain the operation of Nixie tube. (08 Marks)  
b. With a diagram, explain the operation of liquid vapour display. (07 Marks)  
c. With a block diagram, explain the strip chart recorder. (05 Marks)

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