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15EE36

Third Semester B.E. Degree Examination, Dec.2018/Jan.2019
Electrical and Electronics Measurements

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. The expression for the mean torque of an electrodynamometer type of wattmeter is given by $T_d \propto M^a E^b Z^c$ where M = mutual inductance between fixed and moving coils, E = applied voltage and Z = Impedance of load circuit. Determine the values of a, b, and c using dimensional analysis and write the equation for T_d. **(08 Marks)**

   b. Explain the fall of potential method used for the measurement of earth resistance. **(08 Marks)**

OR

2 a. Derive the equations for balance in case of Maxwell's inductance capacitance bridge. Draw the phosor diagram for balance condition. **(08 Marks)**

   b. An DC bridge has the following braches :
   Arm ab : an unknown impedance (R_1, L_1) in series with a non inductive variable resistor r_1.
   Arm bc : a non inductive resistor $R_3 = 100\Omega$
   Arm cd : a non inductive resistor $R_4 = 200\Omega$
   Arm da : a non inductive resistor $R_2 = 250\Omega$
   Arm dc : a non inductive variable resistor r,
   Arm ec : lossless capacitor c = 1µF and
   Arm be : a detector
   An AC supply is connected between a and C. Calculate resistance R_1 and inductance L_1 under balance condition. $r_1 = 43.1\Omega$ and $r = 229.7\Omega$. **(08 Marks)**

Module-2

3 a. Explain the special features incorporated in an electrodynamometer type of wattmeter so that it can be used for low power factor application. **(08 Marks)**

   b. Explain how the following adjustments are made in single phase induction type energy meter i) lag adjustment ii) adjustment for friction compensation iii) over load compensation iv) creeping. **(08 Marks)**

OR

4 a. Describe the constructional details and working of a single phase electrodynamometer type of p.f meter. Prove that the special displacement of moving system is equal to the phase angle of the system. **(08 Marks)**

   b. Explain the construction and working of Weston type frequency meter. **(08 Marks)**

Module-3

5 a. How is the current range of a PMMC instrument extended with the help of shunts? Describe the method of reducing the errors due to temp charges in the shunt connected equipment. **(08 Marks)**

 b. The exciting current of a current transformer is 2A logging 40° to the secondary voltage reversed. The C.T has a bar primary and a nominal ratio of 100/1A. The external burden is 1.5Ω and the resistance of the secondary winding is 0.25Ω. When 1A of current is flowing through the secondary winding, calculate the actual ratio of C.T and its phase angle. **(08 Marks)**

OR

6 a. Describe a method of experimental determination of flues density in a specimen of magnetic material using a ballistae galvanometer. **(08 Marks)**

 b. Explain the construction and working of Hopkinson permeametor. **(08 Marks)**

Module-4

7 a. With block diagram, explain the working of true RMS reading voltmeter. **(08 Marks)**

 b. With block diagram explain the working of Ramp type DVM. **(08 Marks)**

OR

8 a. Describe the working principle of Q-meter with circuit diagram. **(08 Marks)**

 b. With block diagram, explain the working of electronic energy meter. **(08 Marks)**

Module-5

9 With a neat sketches explain the function the following instruments used in electronic devices : i) LED ii) LCD iii) Nixe tubes. **(16 Marks)**

OR

10 a. Explain with a suitable circuit diagram of an x-y recorder mention its advantages and disadvantages. **(08 Marks)**

 b. With a neat diagram, explain the construction and working principle of strip chart recorder. **(08 Marks)**

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