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Third Semester B.E. Degree Examination, Dec.09/Jan.10
Electrical Measurements

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Derive the dimensional equation for :
 i) Pole strength ; ii) e.m.f ; iii) Flux ; iv) Flux density ; v) mmf ; vi) Reluctance, in the electromagnetic units. (06 Marks)
- b. Determine the value of a m and n from the dimensional analysis of the following equation
 $P = KV^m I^n$
 where P = power in watts,
 V = voltage applied in volts
 I = current in amperes, K = constant of proportionality. (06 Marks)
- c. Calculate the current through the galvanometer for the Wheatstone bridge is shown in Fig.1(c). $R_1 = 2\text{ K}\Omega$, $R_2 = 4\text{ K}\Omega$, $R_3 = 7\text{ K}\Omega$, $R_4 = 20\text{ K}\Omega$ and Galvanometer resistance $R_g = 300\ \Omega$, $V = 8\text{V}$. (08 Marks)

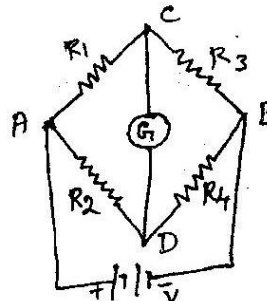


Fig.1(c).

- 2 a. Explain the fall of potential method, used for the measurement of earth resistance. (06 Marks)
- b. With the help of a neat diagram, explain the operation of a megger. (06 Marks)
- c. Derive the balance equation for Schering bridge used for measurement of capacitance. Derive the expression for loss angle and dissipation factor. (08 Marks)
- 3 a. Design an Ayrton shunt to provide an ammeter with the current ranges 1A, 5A and 10A. A basic meter resistance is $50\ \Omega$ and full scale deflection current is 1 mA. (06 Marks)

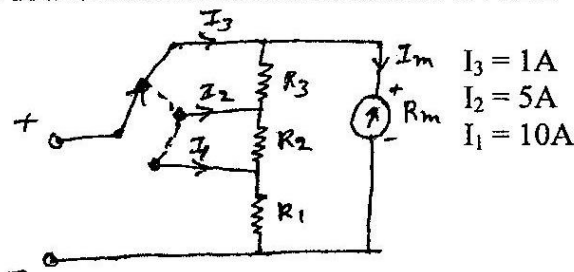


Fig.3(a)

- b. Explain the construction and working principle of a potential transformer. (08 Marks)
- c. Write the comparison of C.T. and P.T. (06 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.

- 4 a. Discuss the adjustment required in energy meter, for accurate reading. (06 Marks)
b. A single phase energy meter has a constant of 1500 rev/kWh. If 8 lamps of 100 W, 6 fans of 60 W and 2 heaters of 1000 W, operate for one hour, the disc makes 4500 revolutions. Find out whether the meter reads correctly. If not, find the percentage error. (06 Marks)
c. With a neat diagram explain the construction and operation of the electro-dynamometer type wattmeter. (08 Marks)

PART – B

- 5 a. Explain with a neat circuit diagram, the working of the successive approximation type D.V.M. (08 Marks)
b. Explain the construction and operation of Weston frequency meter. (08 Marks)
c. Write a note on phase sequence indicator. (04 Marks)
- 6 a. With a neat block diagram, explain the working of a digital storage oscilloscope. (10 Marks)
b. Explain with help of a block diagram, dual trace oscilloscope. (10 Marks)
- 7 a. Explain with a neat sketch, the construction and working of a Linear Variable Differential Transformer (LVDT). (08 Marks)
b. Explain photoconductive and photovoltaic cells. (06 Marks)
c. What are the selection criteria for the transducer? (06 Marks)
- 8 a. Explain with a block diagram, functional operation of digital data acquisition system. (08 Marks)
b. Explain with a neat diagram, the working of function generator. (06 Marks)
c. With a neat sketch, explain the working of a X – Y recorder. (06 Marks)

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