Calculate the value of unknown resistance, current the power lost in it.

c) What is phantom loading?

d) What are the applications of DC potentiometer?

OR

Describe the construction detail and working of single phase Induction type energy meter.

5. a) What are the advantages of moving iron power factor meter?

b) What are the different types of frequency meter?

c) Explain the step by step method for determination of B-H curve.

d) Wheatstone bridge shown in fig. 2.

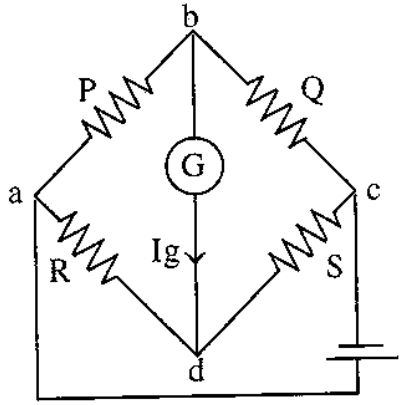

Fig-2

The value of resistance are :

P = 1kΩ, R = 1kΩ, S = 5KΩ, G = 100Ω

The Thevenin source generator voltage E_0 = 24 mv and the galvanometer current is 13.6 μa. Calculate the value of Q.

OR

Explain the fall of potential method.

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 Roll No .....

EX/EE - 303

B.E. III Semester

Examination, June 2014

Electrical Instrumentation

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) A moving coil voltmeter has a uniform scale with 100 divisions, the full scale reading is 200v and 1/10 of a scale division can be estimated with a fair degree of certainty. Determine the resolution of instrument in volt.

b) A 50v range voltmeter is connected across the terminal A and B of the circuit shown in fig 1 find the reading of the voltmeter under open circuit and loaded conditions. Find the accuracy and the loading error. The voltmeter has a resistance of 100kΩ.

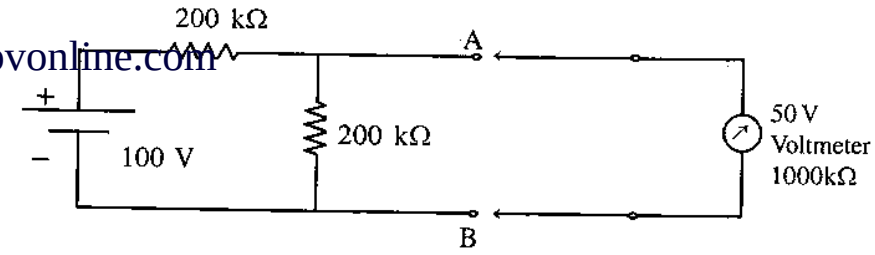

Fig-1

c) Explain Hysteresis effect.

d) Explain D'arsonval galvanometer.

OR

A galvanometer gives a deflection of 150mm on linear scale distant 2.5m for a steady current of 1μA. The period oscillations is 4s and the moment of inertia of moving system is 1×10^{-6} kg m^2 calculate the coil circuit resistance necessary to obtain critical damping, assuming damping torque produced due to open effect to be negligible. The galvanometer uses a mirror and scale arrangement with a collimated light falling on the mirror.

2. a) A permanent magnet moving coil instrument has a coil of dimensions 15mm×12mm. the flux density in the air gap is 1.8×10^{-3} wb/m^2 and the spring constant is 0.14×10^{-6}Nm/rad. Determine the number of turns required to produce an angular deflection of 90 degree when a current of 5mA is flowing the coil.

b) The inductance of moving iron instrument is given by $L=\left(10+5\varnothing-\varnothing^2\right)\mu H$. When $\varnothing$ is the deflection in radian from zero position. The spring the spring constant is 12×10^{-6} N, m/rad. Estimate the deflection for current of 5A.

c) What is hot wire instrument?

d) Describe the construction detail and working of an electrodynamometer type instrument.

OR

What are the advantages and disadvantages of electrostatic instruments?

3. a) How many wattmeters are used for measuring the power in 3 phase four wire circuit?

b) What is a low power factor wattmeter?

c) Describe the errors in electrodynamometer type wattmeter's.

d) A potential transformer, ratio 1000/100 volt has the following constant

Primary resistance = 94.5Ω, Secondary resistance = 0.86Ω Primary reactance = 66.2Ω. Total equivalent reactance = 110Ω, No load current = 0.02A at 0.4 power factor.

Calculate the following :

i) Phase angle error at no load.

ii) Burden in VA at unit power factor at which the phase angle will be zero.

OR

What are the advantages of instrument transformer?

4. a) What is Tri-vector meter?

b) During the measurement of a low resistance using a potentiometer the following reading were obtain : Voltage drop across the low resistance under test = 0.441v, Voltage drop across a 0.1Ω standard resistance = 1.0235v.