KafrElshiekh University Faculty of Engineering Department: Mechanical Engineering Year : 2nd year(2007) 2015-2016 Subject: Electrical Engineering		Date: 26-1-2016 Time Allowed: 3:00 hr. Full Mark: 70 Marks. Final Exam: -- Academic Code: EPM 2133 Exam: Two pages

Answer the Following Questions:

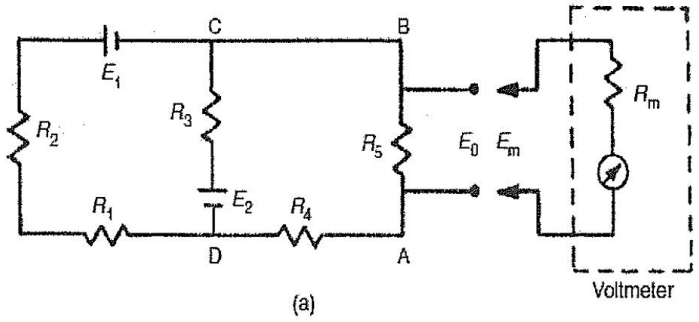
Q1 **15**

a) State: the types of errors and sensors.

b) Suppose that the components in the circuit shown in the figure have the following values:

R1 = 320 ; R2 = 950 ; R3 = 1100 ; R4 = 200 ; R5 = 240.

If the instrument measuring the output voltage across AB has a resistance of 4000 , what is the measurement error caused by the loading effect of this instrument?



(a)

Q2 **10**

A 3- phases , 380 v, 50 Hz, balanced supply, balanced loads consists of three equal single phase loads of (20+j10) Ω connected in star, and three phases heating loads of 1.2 kW,

Determine:

a) The supply current, supply active power, reactive power, and power factor

b) The value of the capacitance that must be connected to improve the overall power factor to 0.98.

Obtain the results using :

1. One phase of the three phase system,
2. The equivalent single phase circuit.

Q3 **15**

a) What are the advantages of DC over AC for transmission lines ?

b) What is the percentage saving in feeder copper if the line voltage in a 2-wire d.c. system is raised from 220 volts to 380 volts for the same power transmitted over the same distance and having the same power loss ?

Q4 **5**

A single phase line has two parallel conductors 2 meters apart. The diameter of each conductor 1.4 cm. calculate the loop inductance per km of the line.

Q5 **10**

A 6 pole wave connection ,DC shunt generator with shunt field resistor of 150 Ω,and armature resistance of 1 Ω,with 500 conductor in armature circuit,the flux per pole is 0.03 Wb.If load resistance of 12 Ω is connected across machine terminals and the generator speed is 1200rpm,calculat the power delivered to the load.

Q6 **10**

a)What is meant by ideal transformer.

b) A23 KVA,2300/230V,60 Hz ,step down transformer with R1=4Ω,R2=0.04 Ω ,X1=12 Ω and X2=0.12 Ω ,the transformer is operating at 0.85% of its full load and the power factor at the load is 0.866 lag, determine the transformer efficiency.

Q7 **5**

Explain the theory of operation of the induction motor,then show what is meant by motor slip.

End of Exam Questions, Good Luck