



MACHAKOS UNIVERSITY

University Examinations for 2016/2017
SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR FIRST SEMESTER EXAMINATION FOR CERTIFICATE IN

ELECTRICAL AND ELECTRONICS ENGINEERING

EED 209: ELECTRICAL MEASUREMENT AND TESTING

DATE: 6/6/2017

TIME: 2:00 – 4:00 PM

INSTRUCTIONS

Answer Question One and Any Other Two Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Name two types of wattmeters. (2 marks)
- b) A moving coil instrument has a resistance of 10Ω and gives full scale deflection when carrying a current of 50mA. Show how it can be adopted to measure voltages upto 750V and currents upto 1000A. (10 marks)
- c) A dynamometer type wattmeter with its voltage coil connected across the load side of the instrument reads 250W. If the load voltage be 200V, what power is being taken by the load. (3 marks)
- d)
 - i) Defferentiate between power and energy (5 marks)
 - ii) the current in acoil decreases from 10A to 4A in 0.1 seconds.if the inductance of the coil is 2mH, find the EMF induced in the coil. (10 marks)

QUESTION TWO (20 MARKS)

An electric heater having resistance of 25Ω is connected to 230V mains supply through a cable having a total resistance of 0.2Ω . calculate the power dissipated by heater, power wasted in cable and total energy consumed in 2 hours. (20 hours)

QUESTION THREE (20 MARKS)

(a) Give three features of a dynamometer wattmeter and two applications of the same.

(10 marks)

(b) It is required to convert a 5mA meter with 20Ω internal resistance into a 5A ammeter. calculate

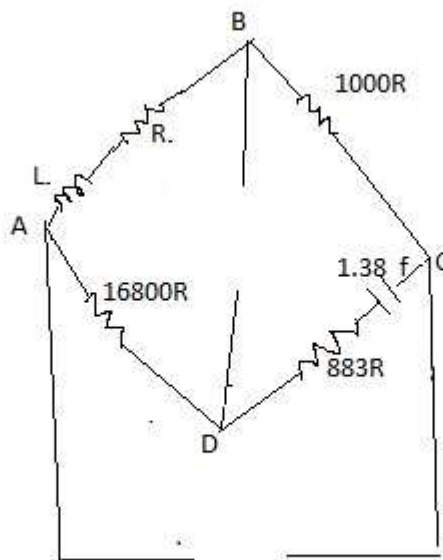
(i) the value of shunt resistance required

(ii) multiplying factor of the shunt

(10 marks)

QUESTION FOUR (20 MARKS)

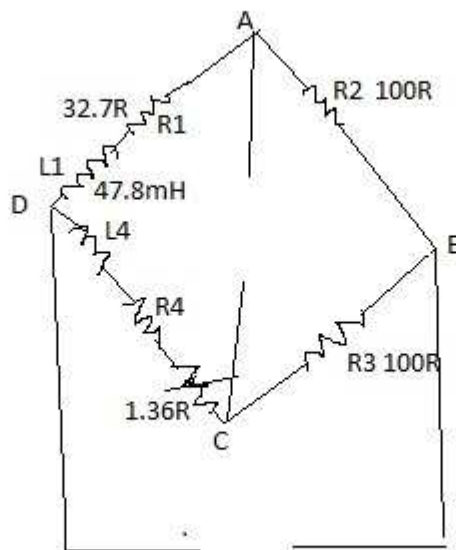
The four arms of a bridge are arranged as shown below.



AB is a coil of unknown R and L, BC is a non inductive resistance of 1000Ω . CD is a non inductive resistance of 883Ω in series with $1.38\mu\text{f}$ capacitor. DA is a non inductive resistance of 16800Ω . The bridge is balanced at 50Hz. Find R and L. (20 marks)

QUESTION FIVE (20 MARKS)

The arms of an AC maxwell bridge are arranged as follows



AB and BC are non reactive resistors of 100Ω each. DA is a standard variable reactor L1 of resistance 32.7Ω and CD comprises a standard variable resistor R in series with a coil of unknown impedance. balance was obtained with $L1 = 47.8\text{mH}$ and $R = 1.36\Omega$. find the resistance and inductance of the coil.