



MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING AND CIVIL ENGINEERING
SECOND YEAR SECOND SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE (CIVIL ENGINEERING)
ECV 211: ELECTROMECHANICAL ENGINEERING

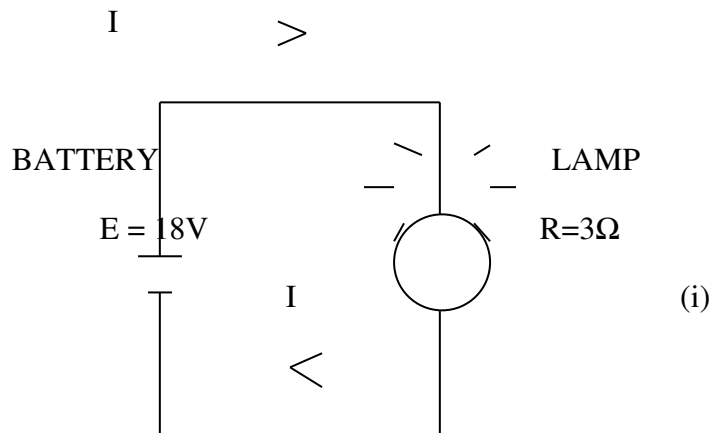
DATE:

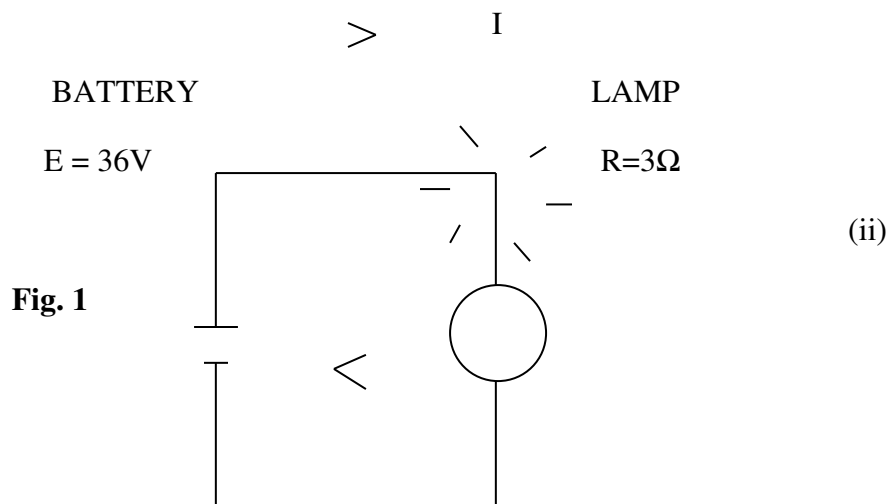
TIME:

INSTRUCTIONS: Attempt questions **ONE** and any other **TWO** questions.

QUESTION ONE (COMPULSORY) (3 MARKS)

- a) Define the following terminologies (5 marks)
- i) Phase
 - ii) Single phase current system
 - iii) Three phase current system
 - iv) Direct current
 - v) Alternating current
- b) Choose the more powerful circuit (i) or (ii)? (10 marks)





- c) How much does it cost a university student to run a 1000W electric kettle for half hour if Kenya Power charges Ksh.15 per unit energy. (5 marks)

QUESTION TWO (20 MARKS)

Given the circuit in **Fig. 2(a)**, calculate

- The total resistance (5 marks)
- The current (5 marks)
- The volt drop across each resistor (5 marks)

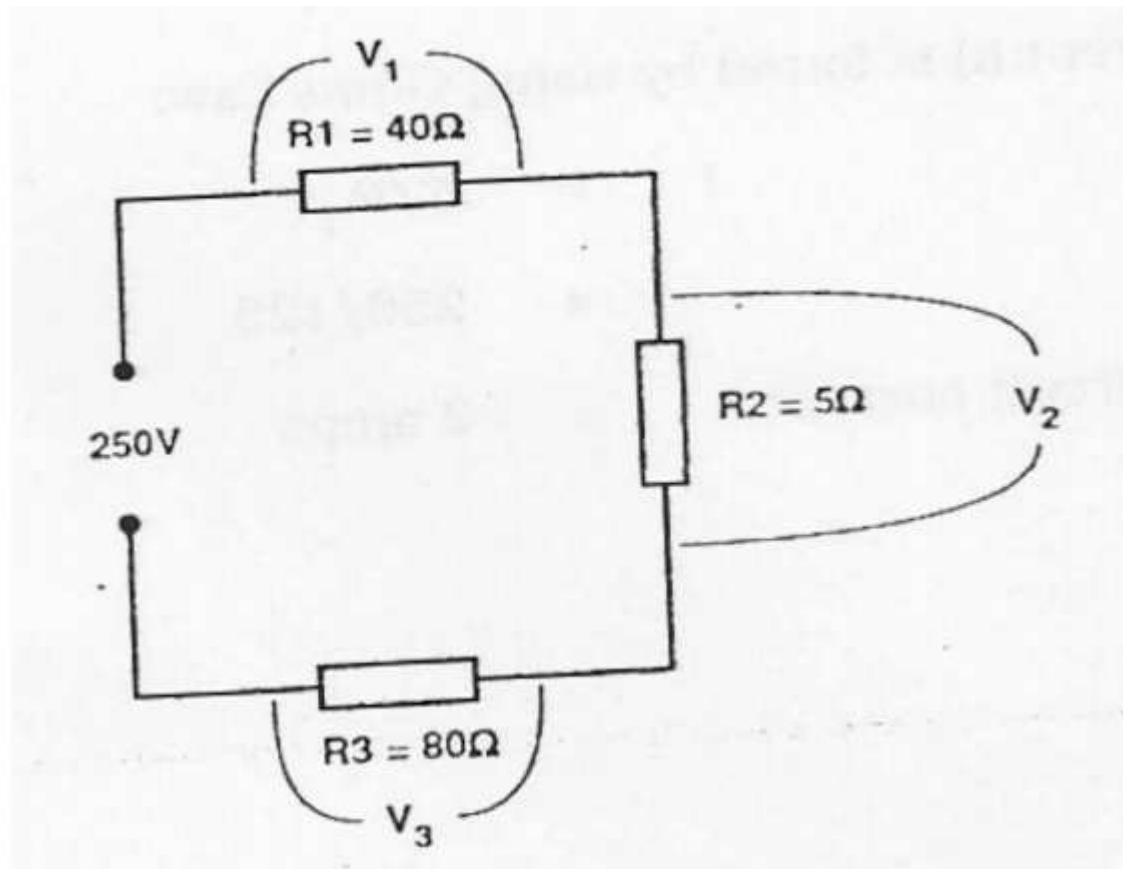


Fig. 2(a)

b) Calculate the volume of the current in R_1 in Fig. 2(b)

(5 marks)

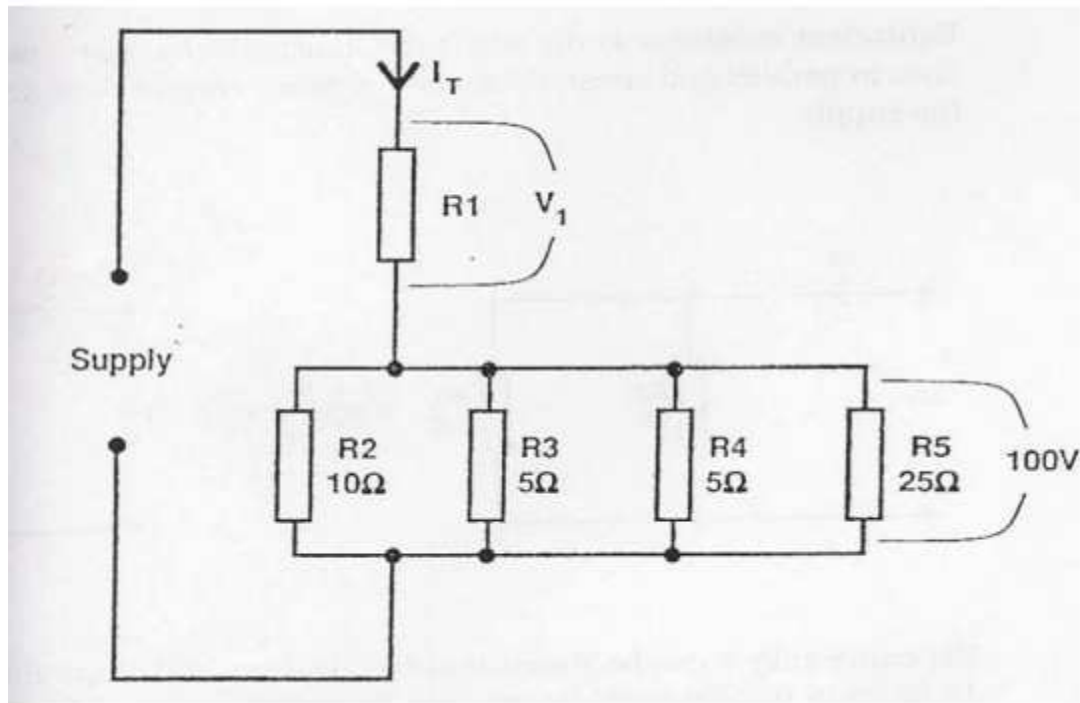


Fig. 2(b)

QUESTION THREE (20 MARKS)

- a) Find the currents flowing around the circuit in **Fig. 3** using Kirchhoff's Current Law (KCL) only. (10 marks)
- b) Using Kirchhoff's Voltage Law KVL only, formulate voltage drop equations in loops
 - i) ABC (5 marks)
 - ii) ABD (5 marks)

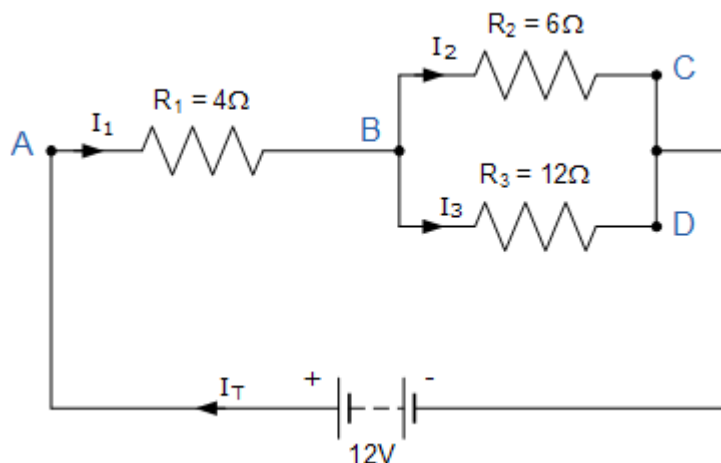


Fig. 3

QUESTION FOUR (20 MARKS)

- a) Differentiate between admittance and impedance. (4 marks)
- b) **Fig. 4** shows an electric circuit. Calculate (16 marks)
- Admittance (Y)
 - Impedance (Z)



Fig. 4

QUESTION FOUR (20 MARKS)

- a) Define (i) Single-phase AC current system (ii) Three –phase AC current system (iii) Differentiate between single phase and three phase current system. (6 marks)
- b) **Fig. 5** shows a single phase AC circuit.. Determine (14 marks)
- Current for each load resistor
 - Total current in the circuit
 - Total power generated by the circuit

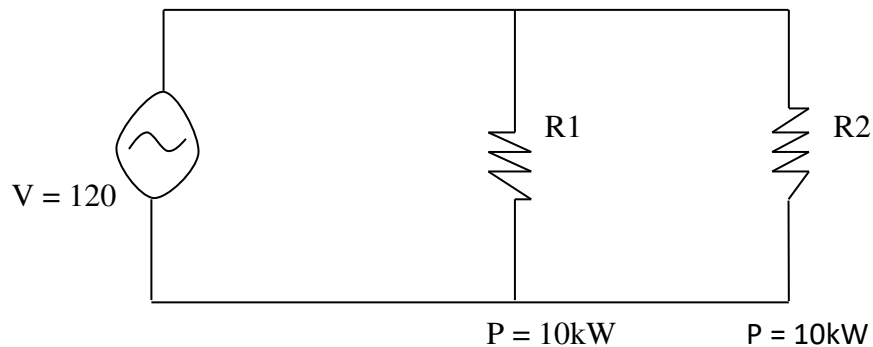


Fig. 5