



MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (CIVIL ENGINEERING)

ECV 211: ELECTROMECHANICAL ENGINEERING

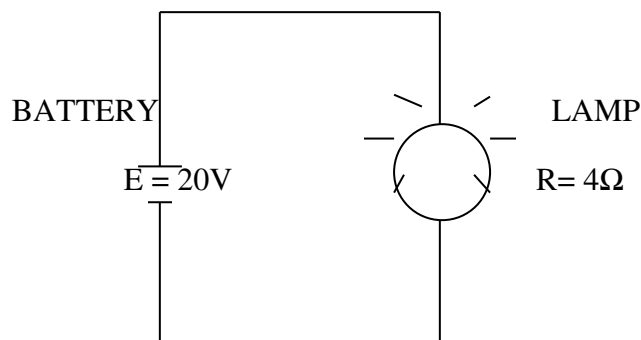
DATE: 25/7/2019

TIME: 2.00-4.00 PM

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

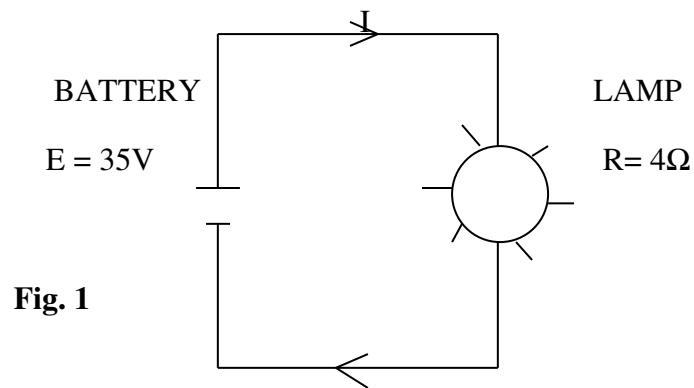
QUESTION ONE (20 MARKS)

- a) Define the following terminologies (5 marks)
- Phase
 - Single phase current system
 - Three phase current system
 - Direct current
 - Alternating current
- b) Determine the power in circuit (i) or (ii)? (10 marks)
- c)



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(i)



(ii)

- c) How much does it cost a university student to run a 1000W electric kettle for an hour if Kenya Power charges Ksh.10 per unit energy? (5 marks)

QUESTION TWO (15 MARKS)

- a) 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)

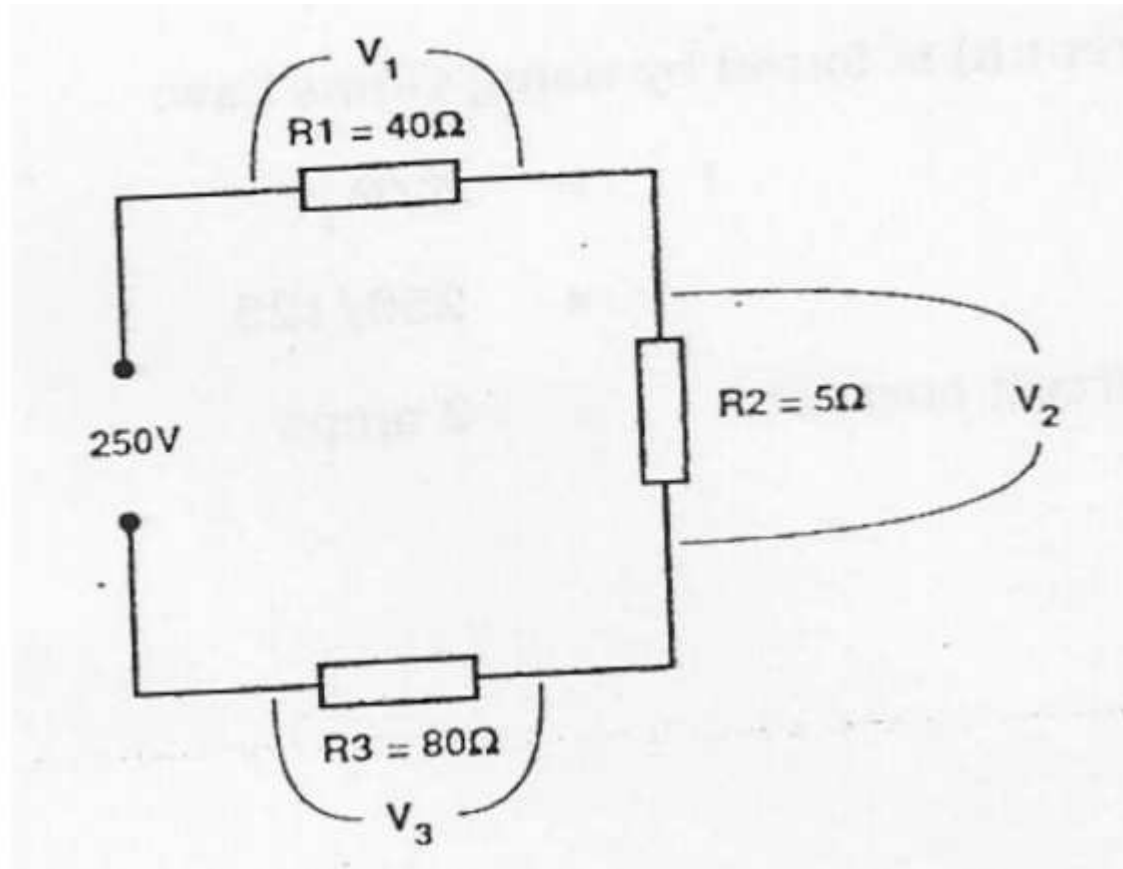


Fig. 2 (a)

- b) Calculate the volume of the current in R_1 in **Fig. 2 (b)** (5 marks)

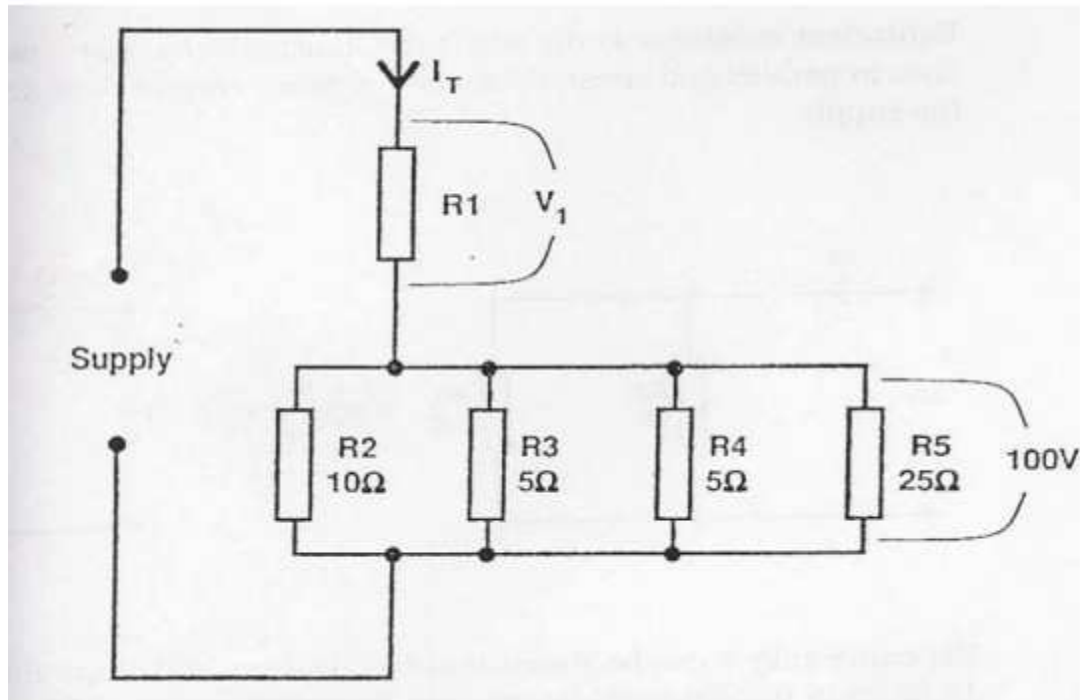


Fig. 2 (b)

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)

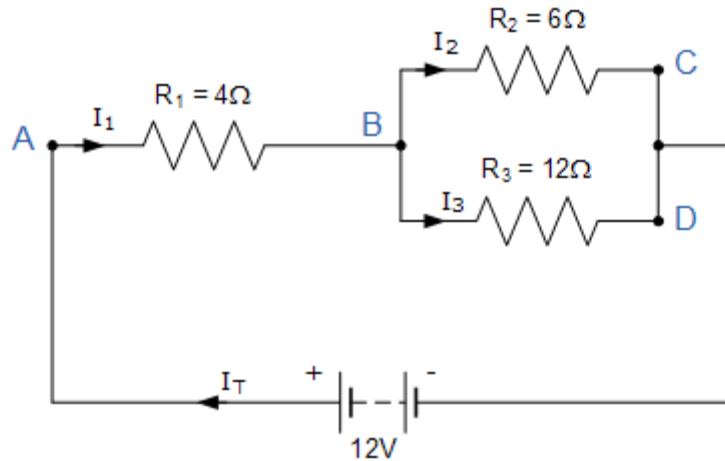


Fig. 3

QUESTION FOUR (20 MARKS)

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



Fig. 4

QUESTION FIVE (20 MARKS)

- a) Define (i) Single-phase AC current system (2 marks)
(ii) Three –phase AC current system (2 marks)
(iii) Differentiate between single phase and three phase current system (2 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

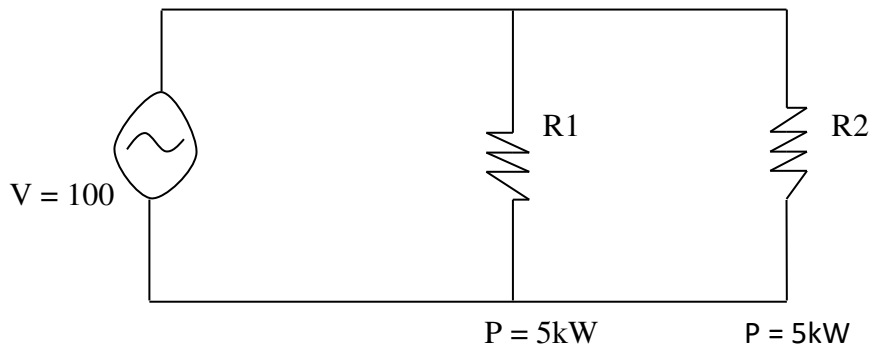


Fig. 5