



UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

END OF SEMESTER II EXAMINATIONS

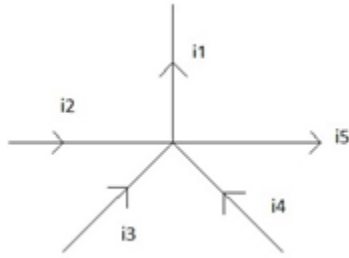
DEPARTMENT : **ICT**
YEAR : **ONE**
SEMESTER : **TWO**
PROGRAM : **DIPLOMA IN COMPUTER SCIENCE**
COURSE : **ELECTRICITY AND MAGNETISM**
COURSE CODE : **EEIII**
DATE : **FRIDAY, JULY 5, 2024**
TIME : **09:00 AM – 12:00 NOON**
DURATION : **3 Hours**

INSTRUCTIONS

- ❖ The paper consists of two Sections A and B
- ❖ Answer **ALL** questions in Section A and **ANY THREE** questions in Section B
- ❖ Credit will be given to relevant examples and illustrations
- ❖ Don Not Write anything on this question paper

Question A1 @ 2marks

1. Relation between currents according to KCL is



- a) $i_1 = i_2 = i_3 = i_4 = i_5$
 - b) $i_1 + i_4 + i_3 = i_5 + i_2$
 - c) $i_1 - i_5 = i_2 - i_3 - i_4$
 - d) $i_1 + i_5 = i_2 + i_3 + i_4$
2. The algebraic sum of voltages around any closed path in a network is equal to _____
- a) Infinity
 - b) 1
 - c) 0
 - d) 2
3. The basic laws for analyzing an electric circuit are :-
- a) Einstein's theory
 - b) Newton's laws
 - c) Kirchhoff's laws
 - d) Faraday's laws
4. A junction where two (or) more than two network elements meet is known as a _____
- a) Node
 - b) Branch
 - c) Loop
 - d) Mesh
5. According to Ohm's law,
- 1. $V \propto R$ 2. $V \propto 1/R$ 3. $V \propto I$ 4. $V \propto IR$
- a) 1,
 - b) 1 & 2
 - c) 3
 - d) 4
6. 1. Resistance of a wire is $y\Omega$. The wire is stretched to triple its length, then the resistance becomes _____
- a) $y/3$
 - b) $3y$

- c) $6y$
 - d) $y/6$
7. An electric current of 10 A is the same as _____
- a) 10 J/C
 - b) 10 V/C
 - c) 10C/sec
 - d) 10 W/sec
8. Consider a circuit with two unequal resistances in parallel, then _____
- a) large current flows in large resistor
 - b) current is same in both
 - c) potential difference across each is same
 - d) smaller resistance has smaller conductance
9. Which of the following bulbs will have high resistance?
- a) 220V, 60W
 - b) 220V, 100W
 - c) 115V, 60W
 - d) 115V, 100 W
10. Resistivity of a wire depends on _____
- a) length of wire
 - b) cross section area
 - c) material
 - d) all of the mentioned

Question A2 @ 2marks

- (a) Define the following in reference to electrical energy stating their SI units [@ 2 marks]
- i. Charge
 - ii. Current
 - iii. Voltage
 - iv. Energy
 - v. Power
 - vi. Resistance
 - vii. Resistivity
 - viii. Conductance

- ix. Coefficient of temperature gradient
- x. Conductor

SECTION B (60 MARKS)

Question 1

- (a) Briefly explain four factors that affect the resistance of a material [8 Marks]
- b) Given a four colour band resistor, explain how the resistance its resistance can be determined [5 Marks]
- (b) A resistor is coded as blue – green – Brown – Gold. Determine
- (i) the resistance [3 Marks]
 - (ii) the minimum resistance [2 Marks]
 - (iii) the maximum resistance. [2 Marks]

Question 2

- (a) State Ohm's law, KVL and KCL for linear resistive circuits. Illustrate your answers with a simple circuit. [6 Marks]
- (b) By use of KCL and KVL, find the current flowing through the 40Ω resistor in Figure Q2 (a) below. [14 Marks]

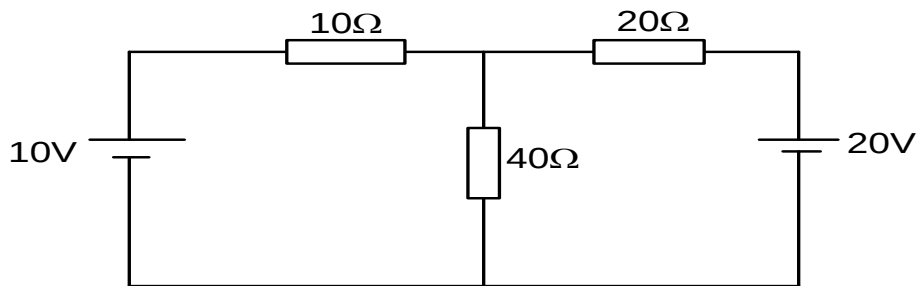


Figure Q2(a)

[14 Marks]

Question 3

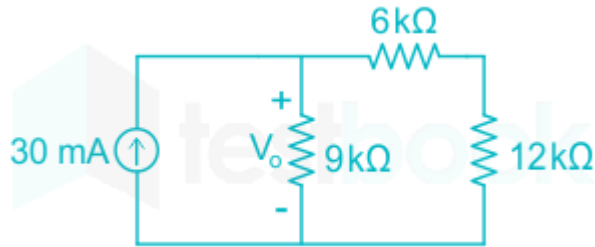
- a) Define a magnet [1 mark]
- b) Distinguish between temporary and permanent magnets [2 marks]
- c) List down four properties of a magnets [4 mars]
- d) What are magnetic materials [1 mark]
- e) Distinguish between three types of magnetic materials [6 marks]
- f) Explain why a magnet is important in the working of an electric bell [3 marks]
- g) With the aid of an illustration, describe magnetic fields [3 marks]

Question 4

- a) State ohm's law [2 marks]

b) Explain for limitations of Ohm's law [8 marks]

c) By use of Ohm's law, calculate the power supplied by the source [6 marks]



d) What do you understand by the following?

(I) Current source

[2 marks]

(II) Voltage source

[2 marks]

Question 5

(a) State KVL and KCL for linear resistive circuits. Illustrate your answers with a simple circuit. [5 Marks]

(b) Find the current flowing in the 3Ω resistor for the network shown in Figure Q1 below. Find also the p.d. across the 10Ω and 2Ω resistors.

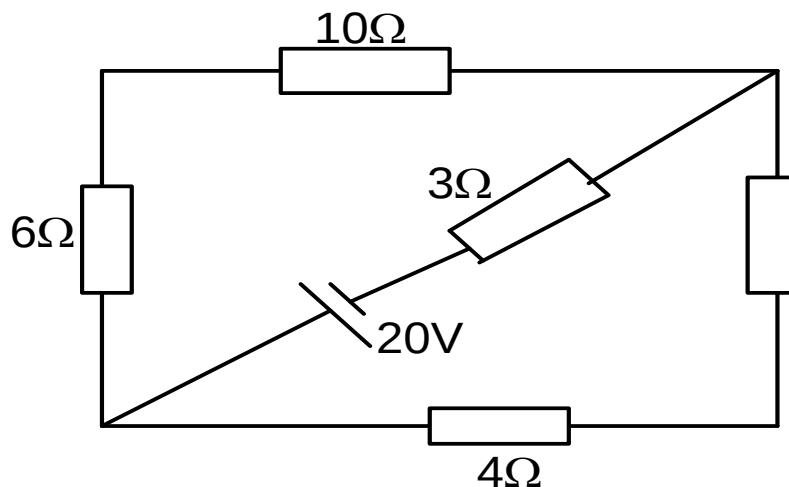


Figure Q1

[9 Marks]

(c) By use of relevant symbols, distinguish between independent and dependent current and voltage sources. [6 Marks]