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**KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR**  
**FOR THE CERTIFICATE IN INFORMATION TECHNOLOGY**  
**CIT 1009- BASIC ELECTRONIS**

Date: 08<sup>TH</sup> DECEMBER 2022  
Time: 2:30PM – 4:30PM

**INSTRUCTIONS TO CANDIDATES**

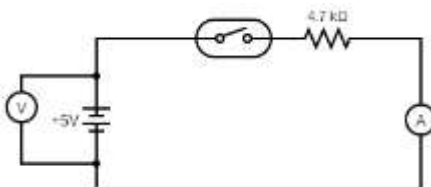
**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

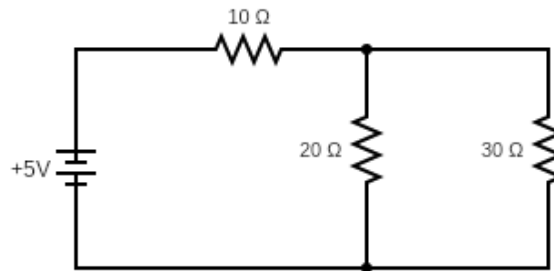
- a) State ohm's law (2 Marks)
- b) With the aid of a diagram differentiate the following
- i) Electron current and Conventional current (3 Marks)
  - ii) AC and DC current (3 Marks)
- c) Define the following electrical components (4 Marks)
- i) Resistor
  - ii) Capacitor
- d) State the advantage of cache memory over primary memory (2 Marks)
- e) State three merits and three demerits of integrated circuits (ICs) (6 Marks)
- f) Given the following binary number, find its equivalent decimal number, hexadecimal number and octal number. (6 Marks)
- a.  $010011011$
- g) Prove that:  $AC+ABC=AC$  (4 Marks)

**QUESTION TWO (20 MARKS)**

- a) Explain your understanding of Integrated circuits (ICs) and give two advantages of using integrated circuit over discrete circuits. (4 Marks)
- b) Explain the following terms as used in electrical circuit and state their SI units? (6 Marks)
- i) Voltage
  - ii) Current
  - iii) Resistance
- c) The figure below shows symbols used in electric circuit, identify the different symbols. (5 Marks)



- d) The circuit below has three resistors connected in a 5V voltage source, calculate the total resistance and the total current flowing through the circuit. (5 Marks)



**QUESTION THREE (20 MARKS)**

- a) Define logic gate? (2 Marks)  
 b) Complete the truth table for the following logic gates (4 Marks)

OR Gate

AND Gate

Input A	Input B	Output		Input A	Input B	Output
0	0			0	0	
0	1			0	1	
1	0			1	0	
1	1			1	1	

- c) A single output Q is produced from three inputs A, B and C. Output Q is required to be 1 only if inputs A and B are 1, or input C is 1 and input B is 0.  
 i) Express this as Boolean equation.  $Q = ?$  (4 Marks)  
 ii) Illustrate your Boolean equation using logic gate to show the output Q. (4 Marks)
- d) Draw the symbols for the following logic gates (6 Marks)  
 i) NOT gate  
 ii) XOR gate  
 iii) NOR gate

**QUESTION FOUR (20 MARKS)**

- a) Briefly describe the following types of number system (4 Marks)  
 (i) Decimal Number System  
 (ii) Binary Number System
- b) Convert the following binary numbers into their equivalent binary numbers. (6 Marks)  
 i)  $BC4_{16}$   
 ii)  $25_8$   
 iii)  $125_{10}$
- c) An alarm clock is controlled by a microprocessor. It uses the 24-hour clock. The hour is represented by an 8-bit register A, and the number of minutes is represented by 8-bit register B. Identify what time is represented by the following two 8-bit registers. (6 Marks)

0	0	0	0	1	0	1	1
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 : 

0	0	0	0	1	1	0	1
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d) Show that:

i)  $A \cdot (A + B) = A$  (2 Marks)

ii) Draw a logic circuit to represent the above Boolean equation (2 Marks)

**QUESTION FIVE (20 MARKS)**

a) Give two advantages and two disadvantages of BCD codes (4 Marks)

b) Binary codes are classified into different categories. What are the four main categories of binary codes? (4 Marks)

c) Convert the following BCD numbers to their equivalent Decimal Numbers

i.  $0100\ 0111_{\text{BCD}}$  (2 Marks)

ii.  $1000\ 0101\ 0111\ 1001_{\text{BCD}}$  (3 Marks)

iii.  $0010\ 0001\ 1011_{\text{BCD}}$  (3 Marks)

d) A computer memory can be volatile or non-volatile, explain the difference between the two. (4 Marks)