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KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
FOR THE CERTIFICATE IN INFORMATION TECHNOLOGY
CIT 1009 – BASICS ELECTRONICS

Date: 07TH December 2023
Time: 11:30AM – 1:30PM

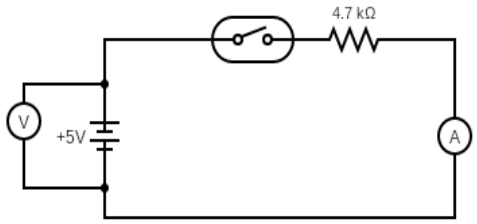
INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) State Ohms law. (2 Marks)
b) State the unit of measurement of the following electrical quantities
   i) Current
   ii) Voltage
   iii) Resistance
   iv) Electric Charge (4 Marks)
c) Show that as the voltage across a resistor increases, the resistance of that specific resistor also increases. Use Ohms law. (4 Marks)
d) State the main difference between RAM and ROM (4 Marks)
e) List any three memory devices which can be used for data back up in computers. (3 Marks)
f) State any three advantages of cache memory over primary memory. (3 Marks)
g) Define logic gate, State and draw three main types of logic gate used in constructing logic circuits. (4 Marks)
h) Perform the following number conversion.
   i) 10101011_2 to Hexadecimal
   ii) 235_8 to binary (6 Marks)

QUESTION TWO (20 MARKS)

a) List any four electrical components you can find in a computer motherboard and clear state their functions. (4 Marks)
b) The figure below shows an electrical circuit. If the reading in voltmeter is 5V and the connected resistor has a resistance of 4700 Ohms. Calculate the reading in the ammeter once the switch is connected. (6 Marks)



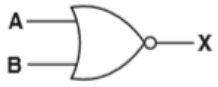
c) Why are insulator materials said to be poor conductors of electricity? Explain. (2 Marks)
d) Define semiconductor, and state two types of semiconductors. (4 Marks)
e) Explain the use of the following electrical components. (4 Marks)
   i) Fuse
   ii) Circuit breaker

QUESTION THREE (20 MARKS)

a) Explain the following Boolean algebra laws and theorem with an example. (6 Marks)
   i) Identity law
   ii) Complement law
   iii) De-Morgan's Theorem

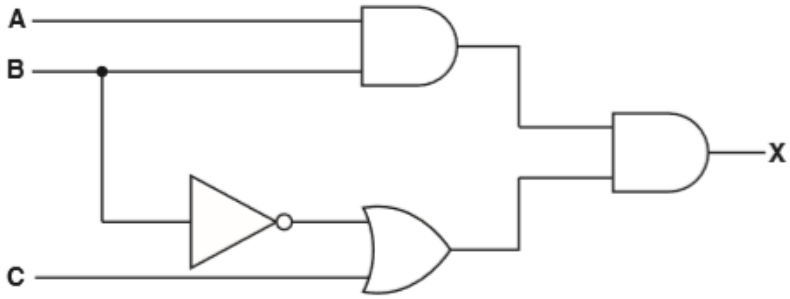
b) Using Boolean algebra laws. Proof that
   X (X+Y) = X (4 Marks)

c) Complete the truth table for the NOR gate below. (4 Marks)



A	B	Output (X)
0	0	
0	1	
1	0	
1	1	

d) Write the logic statement that corresponds with the following logic circuit. (6 Marks)



QUESTION FOUR (20 MARKS)

a) Explain any three differences between primary memory and secondary memory. (6 Marks)

b) Explain the following examples of secondary memory technologies giving an example for each one of them. (6 Marks)
   i) Magnetic disks
   ii) Solid State disks
   iii) Optical disks

c) Define number system. (2 Marks)

d) Explain two characteristics of each of the following number systems. (6 Marks)
   i) Binary number system
   ii) Decimal Number system
   iii) Octal number system.

QUESTION FIVE (20 MARKS)

a) Convert $\mathbf{2C5_{16}}$ it's equivalent number systems
   i) Binary number (3 Marks)
   ii) Octal number (3 Marks)
   iii) Decimal number (4 Marks)

b) Show that:
   $\boldsymbol{XZ + XYZ = XZ}$ (4 Marks)

c) Two resistors connected in series (R1,R2) are connected to two resistors that are connected in parallel (R3,R4). The series-parallel combination is connected to a battery. Each resistor has a resistance of 10.00 Ohms. Draw this circuit and calculate the total resistance in the circuit.(6 Marks)