UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
SECOND YEARS SEMESTER TWO EXAMINATIONS

FOR THE DIPLOMA IN
(INFORMATION TECHNOLOGY)

COURSE CODE : DIT 079
COURSE TITLE : DIGITAL ELECTRONICS

DATE: 19/04/2023 **TIME:** 9.00 A.M. - 11.00A.M. 2HRS

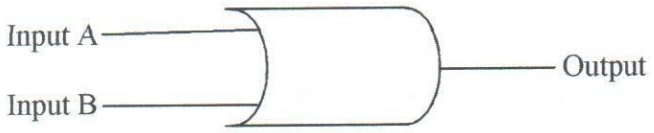
INSTRUCTIONS TO CANDIDATES
ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [24 MARKS]

a) i) Briefly explain the term digitalogics. (2 Marks)

ii) State three advantages and one limitation of digital technique when compared to analog technique. (4 Marks)

b) The diagram shows the symbol for one type of logic gate.



i) Name the type of gate used. (2 Marks)

ii) Draw and complete the truth table of this gate. (4 Marks)

c) Briefly explain Application of Digital circuits in our industries today (4 Marks)

d) Why are digital circuits smaller in size compare to the former analog circuits? (4 Marks)

e) Convert the following to Binary

i. 600_{10} (2 Marks)

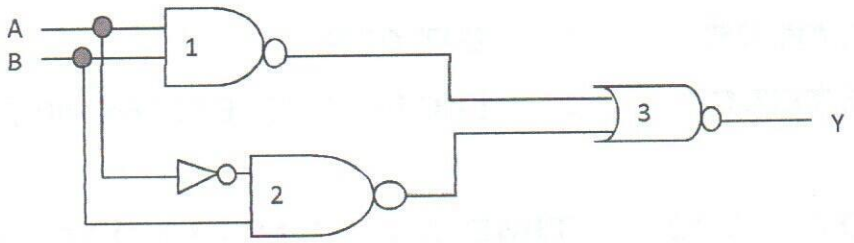
ii. $(9F2)_{16}$ (2 Marks)

QUESTION TWO [18 MARKS]

a) What are universal gates? Name two universal gates. (3 Marks)

b) Design a logic circuit having three inputs A, B and C which will have its output HIGH only when a majority of the inputs are HIGH. (8 Marks)

c) Find the Boolean expression for the logic circuit shown in the figure below. (7 Marks)



Figure

QUESTION THREE. [18 MARKS]

a) i) Express the following equation as sum of product; (3 Marks)

F=A+BC+ (A+ $\overline{C}$) B

ii) Express the following equation as product of sum; (3 Marks)

$F=AB+AC+B\overline{C}$

b) Prove the following theorem $(Z + X).(Z+\overline{X} +Y)=(Z+X.(Z+Y)$ (6 Marks)

c) Prove De Morgan's theorem for three variables $\overline{(A+B+C)}= \overline{A}+\overline{B}+\overline{C}$ by filling up a truth table. (6 Marks)

QUESTION FOUR [18 MARKS]

a) Solve the following using binary system of numbers using 2's complements : (4 Marks)

i. $72 - 45=$

ii. $45 - 20 =$

b) Evaluate the following division using binary system of numbers : (6 Marks)

i. $99 \div 11=$

ii. $324 \div 27=$

c) Convert the following numbers without the use of calculator (8 Marks)

i. 1101_2 into decimals

ii. 874_{10} into BCD

iii. $0101111010110101001 0_2$ into hexadecimal

iv. 684_{10} into hexadecimal

QUESTION FIVE [18 MARKS]

a) i. Distinguish between a static and a dynamic memories. (4 Marks)

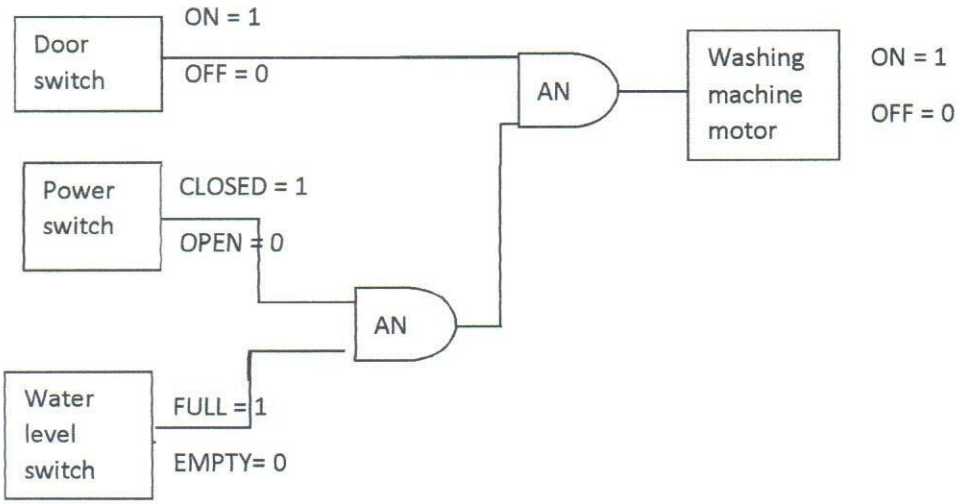
ii. how many flip flops do you require to store; (4 Marks)

a) 8 byte data

b) 16 kb data

b) What is a logic gate (4 Marks)

c) The diagram shows a control system which may be fitted in an automatic washing machine.



i. Draw and complete a truth table for this control system. (3 Marks)

ii. What conditions will stop the washing machine working? (3 Marks)