

SIR ARTHUR LEWIS COMMUNITY COLLEGE
FACULTY OF ENGINEERING
ACADEMIC YEAR (2024/2025) - SEMESTER TWO
END OF SEMESTER EXAMINATION

LECTURER(S) : **Mr Kendall Numa**
PROGRAMME TITLE : **Electrical Installation**
COURSE TITLE : **Basic Digital Electronics**
COURSE CODE : **ELE133**
LEVEL : **Associate Degree/ Year Ones**
PAPER : **One (1)**
DATE : **Tuesday, 6th May 2025**
COMMENCEMENT TIME : **1:00p.m.**
DURATION : **Two (2) Hours**
INVIGILATOR(S) : **N. Fevrier (Chief), S. Joseph, H. Malcolm & J. Vité**
ROOM(S) : **UWI-0R-01**

GENERAL INFORMATION AND INSTRUCTIONS

- This paper consist of One (1) Section with six (6) questions. You are required to answer all questions within this section. Marks are awarded accordingly.
- Students must produce sufficient working steps, to justify solution.
- Formulae used in obtaining solutions must first be stated.
- Write legibly in blue or black ink. Please number your responses accurately.
- The number in the brackets “[]” next to each question are the marks allocated.
- Students must sign **IN** and **OUT** on the examination class list.
- Students must **not** write their names on their answer sheets, only their ID number

**DO NOT TURN THIS COVER SHEET UNTIL
YOU ARE TOLD TO DO SO!!!**

SECTION A

You are required to answer all questions.

Question One

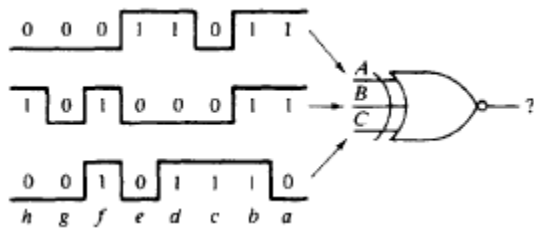
(A) Complete the following table [6]

Inputs			Outputs					
A	B	C	AND	OR	NAND	NOR	XOR	XNOR
0	0	0						
0	0	1						
0	1	0						
0	1	1						
1	0	0						
1	0	1						
1	1	0						
1	1	1						

(B) Write the Boolean expression for the two input version of the AND, OR, NAND, NOR, XOR and XNOR. [6]

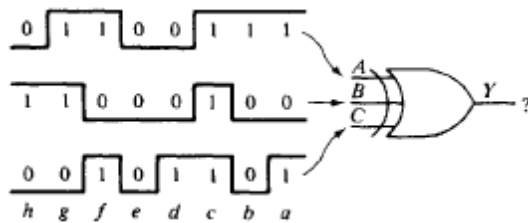
(C) Draw the output waveform for the following diagrams

i)



[4]

ii)

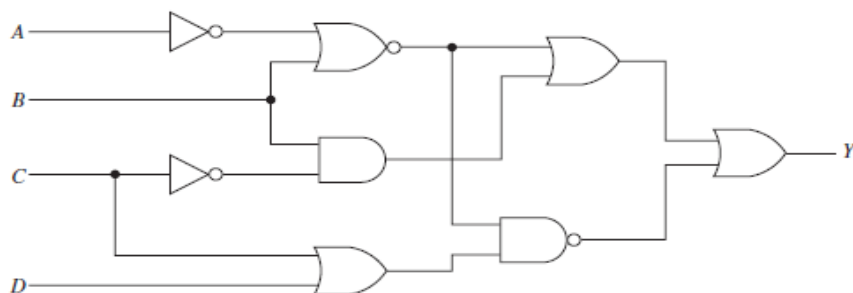


[4]

[20 marks]

Question Two

(A) Write the Boolean expression for the logic circuit shown below.



[8]

(B) Draw the logic circuit for the Boolean expression shown below:

$$Y = \overline{AB} + CD + \overline{ACD}$$

[6]

(C) Draw the truth table for the Boolean expression shown below:

$$Y = \overline{(AB)} + \overline{C} + BC$$

[8]

(D) Use truth tables to prove that $yz + xy\bar{z} + \bar{x}\bar{y}z = xy + \bar{x}z$

[4]

- (E) Given an OR gate and inverters draw a logic diagram that will perform the three input AND function [4]
[32 marks]

Question Three

- (A) Use De Morgan’s theorem to simplify the following expression so that bars are not over more than one variable at any one time:

$$\overline{\overline{A} + B(BC) + \overline{B}C} \quad [4]$$

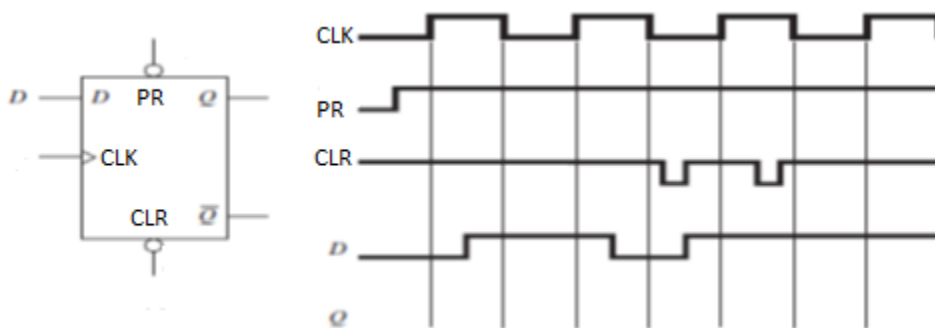
- (B) Write the minterm (SOP) and maxterm (POS) expression for the following truth table

Inputs			Output
A	B	C	Y
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

[4]
[8 marks]

Question Four

- (A) What is the difference between a sequential logic circuit and a combinational logic circuit? [4]
- (B) What is the difference between an asynchronous sequential logic circuit and a synchronous sequential logic circuit? [4]
- (C) Draw the circuit diagram and the truth table for a NAND Gate SR latch (active low). [4]
- (D) Draw the characteristics table for the device shown below and sketch the Q output for the waveform diagram given below



[12]

[24 marks]

Question Five

- (A) Name the four types of shift registers. [4]
- (B) Draw the logic circuit diagram for 2 bit versions of any two using D flip flops [4]
- (C) Give the four characteristics that must be taken into account when designing a counter. [4]

[12 marks]

Question Six

- (A) What is a diode? [2]
 - (B) What is a P-type material [2]
 - (C) Define the term rectification. [2]
 - (D) Draw the circuit diagram for a full wave rectifier [4]
- [10 marks]

Total [106 Marks]

END OF EXAMINATION!!!