COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCSC 116: FUNDAMENTALS OF DIGITAL ELECTROINCS

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2021

LECTURER: MR T MAKAMBWA.

TIME: 5 HOURS

INSTRUCTIONS

Answer one question.

Credit will be awarded for logical, systematic and neat presentations

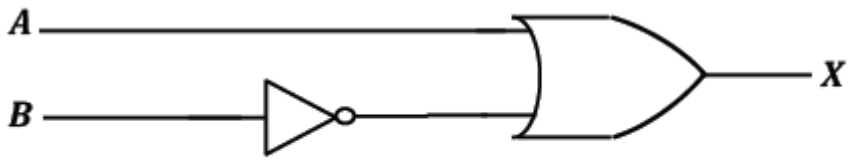
Use logsim simulator for the logic drawings

QUESTION 1. [100]

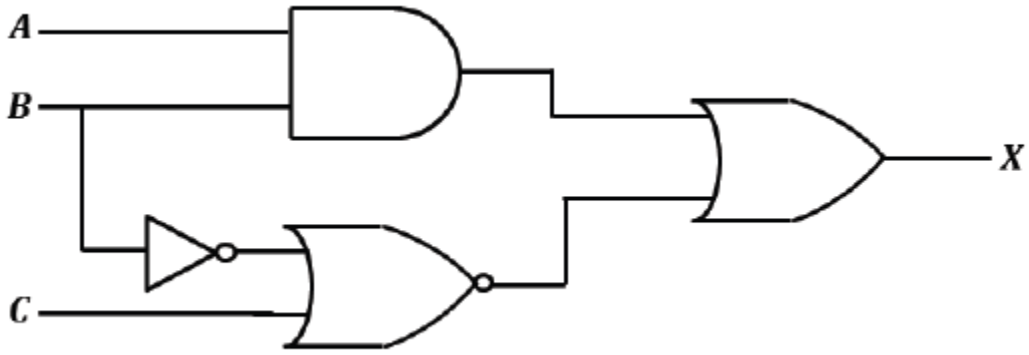
For each the logic circuit given below draw the following logic diagrams

- determine the Boolean expression for the output X, construct the Corresponding truth table and simulate the Boolean expression. **[60 marks]**

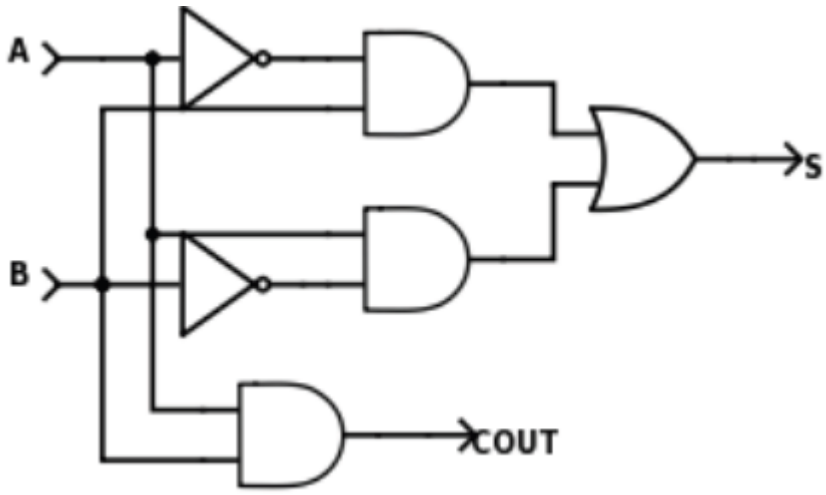
(a)



(b)



(c)



(d) Using the expression below draw the logic diagram and simulate the truth table. **[40 marks]**

$$Y = A.\overline{B}.\overline{C} + \overline{A}.B.\overline{C} + A.B.C + \overline{A}.\overline{B}.\overline{C}$$

Question 2. [100]

(a) Using a logic gate simulator draw the logic circuit diagrams for the following gates

(i) NOT **[2 marks]**

(ii) AND **[5 marks]**

(iii) NAND **[5 marks]**

(iv) OR **[5 marks]**

(v) NOR **[5 marks]**

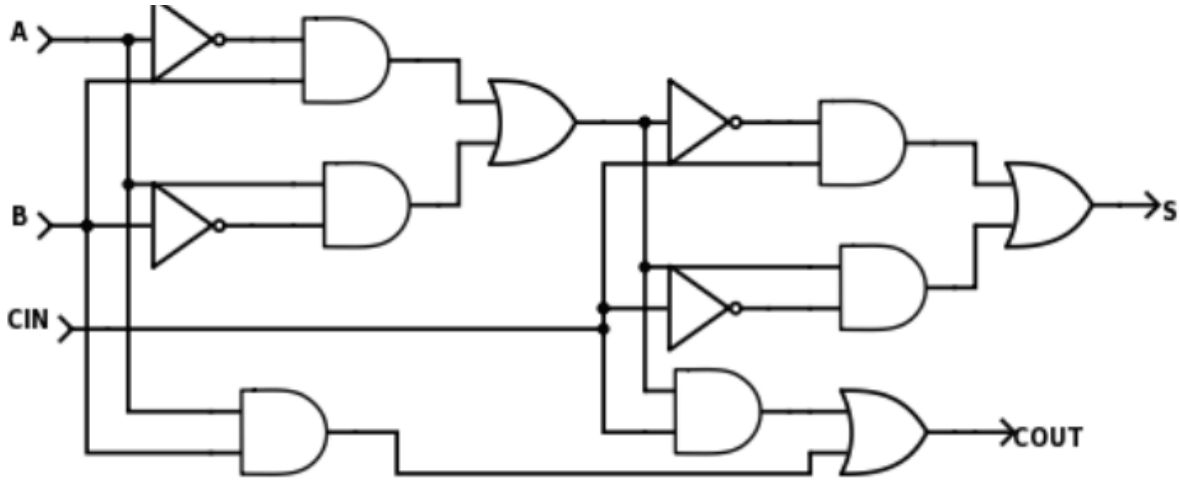
(vi) XOR **[5 marks]**

(vii) XNOR **[5 marks]**

(b) Reproduce the truth tables for the above logic gates [**14 marks]**

(c) Simulate the Boolean expression for each logic gate above. **[14 marks]**

(d) (i) Using a logic gate simulator draw the logic circuit diagram below. **[30 marks]**



(ii) Simulate the truth table. **[5 marks]**

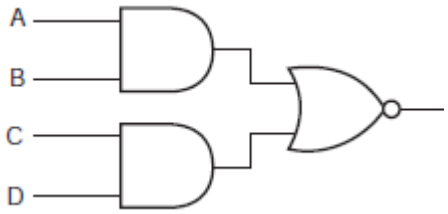
(iii) Simulate the Boolean expression **[5 marks]**

QUESTION 3

Draw the following logic diagrams:

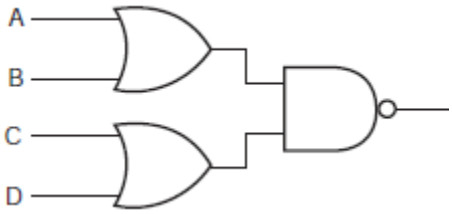
(i) Draw the logic diagrams
(ii) Simulate their truth tables
(iii) Boolean expression

(a)



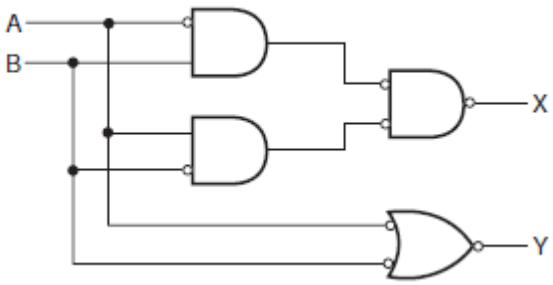
[15 marks]

(b)



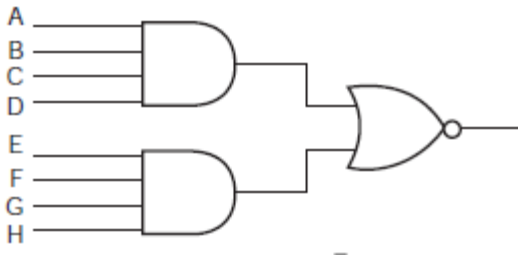
[15 marks]

(c)



[15marks]

(d)



[15 marks]

(e) Draw the logic circuit diagram from the Boolean expression below. **[40 marks]**

(i) O= X+YZ

(ii) $x = A\,B\overline{(\overline{A} + BC)}$

(iii) $x = A\,B\,\overline{C}$

(iv) $z = (\overline{A} + B)(A + \overline{B})$

END OF PAPER