



UNIVERSITY EXAMINATIONS: 2025/2026
EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN
INFORMATION TECHNOLOGY
BSIT 101
DIGITAL ELECTRONICS
END TERM EXAMINATION

DATE: 5.30 PM-8.30PM, DECEMBER, 2025

TIME: 3 HOURS

INSTRUCTIONS: Question One is Compulsory, Choose Three Other Questions

SECTION A (COMPULSORY)

QUESTION ONE (10 marks)

- a) Translators are commonly used in digital electronics, name and explain any two translators (2 marks)
- b) Convert the following Decimal numbers, into Binary Number. (2 Marks)
246.57910 Show all the working.
- c) Discuss two justifications why designers simplify logic circuits before implementation. (2 marks)
- d) Simplify the Boolean function below, using any technique of your choice. (2 marks)

$$Y = \overline{A}BC + A\overline{B}C + \overline{A}B\overline{C} + A\overline{B}\overline{C} + ABC$$

- e) Flip-flops are commonly used in digital circuits, discuss two application (2 marks)

SECTION B

(ANSWER ANY THREE (3) QUESTIONS IN THIS SECTION)

QUESTION TWO (10 Marks)

- a) Discuss three important aspects of the truth table in logic gates (3 Marks)
- b) Design, from the first principle, a four-input logic circuit, such that the output will be high, only if three or more inputs are high. Simplify the logic circuit derived and implement the design. (7 Marks)

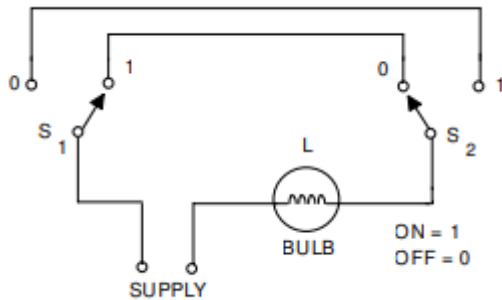
QUESTION THREE (10 Marks)

- a) Explain the key difference between the BCD (Binary Coded Decimal) code and a standard binary representation. Show the representation for the decimal number 59 in both.(5 marks)
- b) Considering the Boolean function shown below, simplify it and hence implement the simplified logic circuit. (5 Marks)

$$Y = ABC + (A + B + C) + ABC$$

QUESTION FOUR (10 Marks)

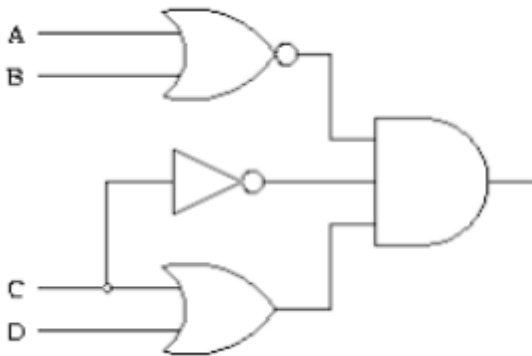
- a) Boolean algebra is commonly used in digital electronics, State the Laws & Rules. (2 marks)
- b) A staircase light is controlled by two switches one at the top of the stairs and another at the bottom of stairs as shown below;



- i) Write the logic equation in SOP form. (3 marks)
- ii) Tabulate a truth table for this system. (5 marks)

Question Five (10 Marks)

- a) Discuss the code where all successive numbers differ from their preceding number by a single bit. (3 marks)
- b) Express the circuit below as a Boolean function. (4 Marks)



- c) Describe three Number systems popularly used in computer systems and digital systems. (3 Marks)

QUESTION SIX (10 marks)

- a) Draw the truth table of a J-K flip-flop with active high inputs. (5 marks)
- b) With the aid of a logic circuit and a truth table, explain the operation of an R-S flip-flop
State the limitations of the R-S flip-flop (5 marks)