NATIONAL OPEN UNIVERSITY OF NIGERIA
University Village, 91 Cadastral Zone, Nnamdi Azikwe Expressway, Jabi, Abuja
FACULTY OF SCIENCES
COMPUTER SCIENCE DEPARTMENT
2021 EXAMINATIONS

CIT 344 – Introduction To Computer Design **Credit:** 3 units
TIME ALLOWED: 2½ Hours
INSTRUCTION: Answer Question 1 and any other FOUR (4) Questions

QUESTION ONE ***(22 marks)***

1. (a) i. Convert 637 in decimal to binary ***(1½ marks)***
ii. Convert 234 in decimal to binary ***(1½ marks)***
iii. Convert 1001101 in base two to base ten ***(2 marks)***
iv. Find the BCD addition of 324 and 234 ***(2 marks)***

(b) Given this expression (a*b) + (a*c), then:
i. Construct the truth table ***(1½ marks)***
ii. write the minterms (***½ marks)***
iii. Write the SOP (***½ marks)***
iv. Draw Karnaugh map (***½ marks)***
v. Simplify the expression (***½ marks)***
vi. Draw the logic gates for the simplified expression (***½ marks)***

(c)

i. What is a Multiplexer? ***(2 marks)***
ii. What are the areas of application of Multiplexer? ***(1 mark)***
iii. What is a Ring Counter? ***(2 marks)***
(d) List and explain three commercially available 4-bit ALUs ***(3 marks)***
(e) Give the meaning of the acronym LEA ***(1 mark)***
(f) What is a mnemonic? (1 mark)
(g) List any four logical operators used in assembly language (1 mark)

QUESTION TWO **(12 marks)**
2. (a) What is an Adder? (1 mark)
(b) Given a 1 Bit full adder:
i. Construct the truth table for 1Bit Full Adder (4 mark)
ii. Simplify SOP for Sum (1 mark)

iii. Simplify SOP for Carry out (1 mark)
iv. Draw Karnaugh map for Sum (1 mark)
v. Draw Karnaugh map for Carry out (1 mark)
vi. Draw logic circuit for minimized expression (3 marks)

QUESTION THREE (12 marks)

3 (a) i. What is a Flip-Flop? **(3 marks)**
ii. Construct the Truth-Table for Positive Edge –Triggered S-R Flip-Flops **(4 marks)**
iii. Construct the Truth-Table for Negative Edge –Triggered S-R Flip-Flops **(4 marks)**
(b) List three different types of edge-triggered flip-flops are generally used in digital logic circuits. **(1 mark)**

QUESTION FOUR (*12 marks)*

(a) Distinguish between Moore State Machine and Mealy State Machine **(8 marks)**

(b) State in tabular form the input and output of an Edge-Detector transitions between two symbols in the input sequence, say 0 and 1 using sequence of pairs for minimum of FIVE different number of possible pairs. **(4 marks)**

QUESTION FIVE (*12 marks)*

(a) Differentiate between RAM and ROM **(4 marks)**
(b) List and explain different Types of ROM **(5 marks)**
(c) Explain different Types of DRAMS **(3 marks)**

QUESTION SIX (*12 marks)*

(a). Construct the Truth-table for a 3-to-8 encoder with enable **(5 marks)**
(b). List SIX important Flip-Flop Operating Characteristics **(3 marks)**
(c). Explain any FOUR Flip-Flop Operating Characteristics **(4 marks)**