



Machakos University

ISO 9001:2008 Certified

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

Supplementary Examination for Bachelor of Science in Information Technology

SIT 107

INTRODUCTION TO DIGITAL ELECTRONICS

Date: /11/2018

Time: 2 HOURS

Instruction

Answer question **ONE** and Any other **Two** among the four selective questions

Question one (Compulsory)

- (a) Discuss common logic hazards including relevant diagrams and symbols **(10 Marks)**
- (b) Minimize the function and realize it using minimum number of gates.
 $F = \sum m(0, 3, 5, 6, 9, 10, 12, 15)$ **(8 Marks)**
- (c) Explain common types of counters **(6 Marks)**
- (d) Using block diagrams, explain operations of the following logic circuits
 - (i) 8-to-3 line Encoder **(3 Marks)**
 - (ii) 1 x 4 Demultiplexer **(3 Marks)**

Question two

- a) Implement a circuit that takes four inputs and outputs a one(1) when any two of the inputs are both ones(1) or **three zeros** (0). **(10 Marks)**
- b) Discuss Full Adder **(4 Marks)**
- c) Flip flop triggering **(6 Marks)**

Question three

- a) Perform the binary arithmetic $18.75_8 - A9_{16}$ **(6 Marks)**
- b) Discuss the conversion of SR into JK flip flop **(8 Marks)**

c) Compare SRAM and DRAM capacitor

(6 Marks)

Question four:

a) Discuss the ROM

(6 Marks)

b) Design 3 Mod counters using J-K Flip Flop and implement it

(8 Marks)

c) Discuss boolean algebra laws

(6 Marks)

Question five:

a) A student is taking a project on traffic light. In his display he would like to use a seven segment display. Using relevant diagrams explain how this would be achieved

(10 Marks)

b) Explain the working of a Shift-register

(6 Marks)

c) Using circuit symbols, truth tables, and boolean expressions, describe NOR gate

(4 Marks)