TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN TECHNOLOGY (ELECTRICAL &ELECTRONICS ENGINEERING) (DEEE3)

EEE 2202: DIGITAL ELECTRONICS II

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: SEPTEMBER 2018

Instructions to Candidates
You should have the following for this examination
-Answer Booklet, examination pass and student ID
This paper consists of FIVE questions. Attempt**ANYTHREE Questions**
Do not write on the question paper.

Question ONE

. (a)(i) Explain the THREE types of triggering signals used in flip flops

(ii) With the aid of block diagrams, describe the FOUR modes of operation of shift registers**(11marks)**

(b)(i) Explain any TWO applications of shift registers

(ii) Explain the term "Multiplexer" in digital circuits.

(iii) With the aid of a diagram explain the operation of a 4-input multiplexer.   **(9marks)**

Question TWO

(a)(i)With the aid of a diagram explain how a shift register can be modified to form a ring counter

(ii) Draw a decade counter and explain its operation   **(10marks)**

(b) Figure 1 shows a block diagram of a counter.

(i) Name the type of counter implemented

(ii) Draw the complete timing diagram for eight clock pulses, showing the clock, Q_0, and Q_1waveforms

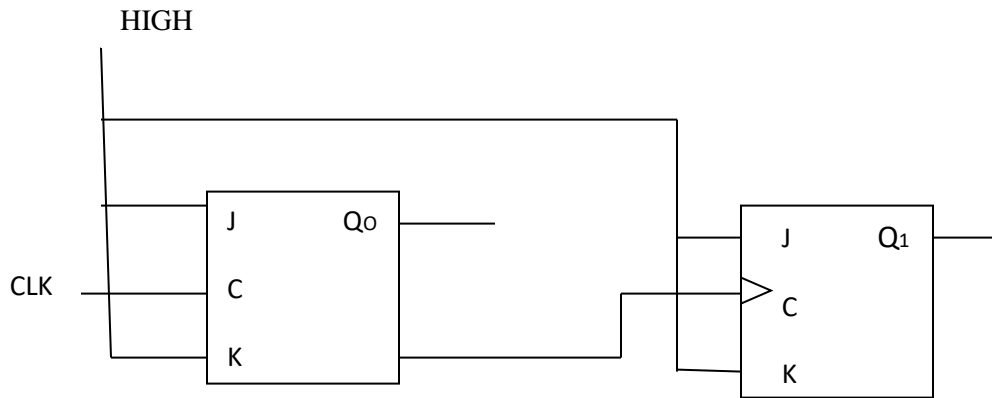(iii) Determine the count at each clock pulse   **(10marks)**

Figure 1

Question THREE

(a) Draw the clocked RS flip-flop and by use of state table explain its operation   **(8marks)**

 (b) (i) Explain how "RACE AROUND condition occurs in flip flops.

   (ii) Explain how the condition in b(i) above is overcome   **(6marks)**

(c) Draw a simplified block diagram of a digital clock and explain its operation.   **(6marks)**

Question FOUR

a)(i) List the FOUR main types of flip-flops used in digital circuits.

   (ii)With the aid of a diagram and state table explain the operation of master slave flip-flop.**(11marks)**

 (b) Explain with the aid of a diagram and truth table why the T-type flip-flop was developed**. (5marks)**

(c) Describe by use of sketches and truth table the basic concept of "bits" storage in digital circuits   **(4marks)**

Question FIVE

(a) Define the following terms as applied to semiconductor memory:

 (i) EEPROM

 (ii)   RAM   **(2marks)**

(b)Draw a Bipolar memory cell and describe its reading and writing process   **(8marks)**

 (c)(i) Explain the steps followed in designing a sequential logic circuit.

(ii) Design a relay switching network with FOUR relay coils and associated contacts to provide a closed path through the contacts when at least TWO coils are energized. **(10marks).**