# TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

## UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN ELECTRICAL ENGINEERING

**EEE 2201: DIGITAL ELECTRONICS II.**

SPECIAL/SUPPLEMENTARY EXAMINATION

**SERIES: SEPTEMBER 2018**

**TIME:** 2 HOURS

**DATE:** Sep 2018

**Instructions to Candidates**

You should have the following for this examination

*Answer Booklet, examination pass and student ID*

This paper consists of Choose No questions. Attempt Choose instruction.

**Do not write on the question paper.**

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**Question ONE**

a) (i)Identify the circuit of fig 1 and explain its operation.

(ii) Draw its truth table. (8marks)

(iii) Using timing diagrams describe how the J-K flip-flop can be used to overcome the limitations of figure 1 (8marks)

(iv) Draw the output waveform for the given input waveforms in fig. 2 when the previous state is taken as Q= 1 and Q bar is = 0. (4marks)

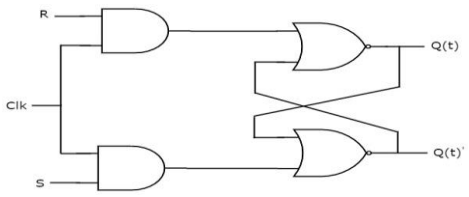


Fig.1

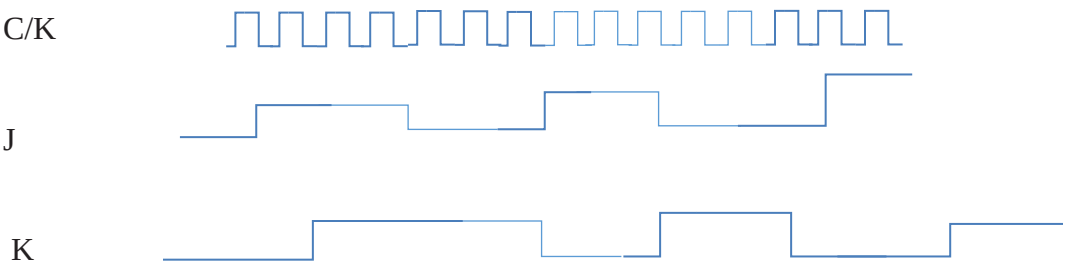


Fig.2

**Question TWO**

**a)** Define the following terms

i. Fan out

ii. Fan in

iii. Power dissipation

(3marks)

**b)** With the aid of a circuit diagram and truth table explain the operation of a TTL NAND gate

(7marks)

**c)** (i) Draw the Diode Logic circuit operating as an AND gate and its truth table hence explain its operation

(7marks)

(ii)State the characteristics of TTL in terms of Fan out, Power dissipation. Fan in, and Noise margin

(10marks)

**Question THREE**

a) Define the following terms as applied in data handling

i. De-multiplexer

ii. Encoder (2marks)

b) Using a truth table implement a 8- line to 3-line encoder (8mrks)

c) Explain the term priority encoding (3marks)

d) Indicate the outputs for the circuit shown in fig.3 stating why the circuit is important in digital networks.

(7marks)

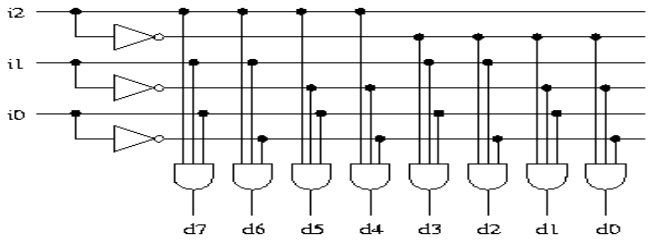


Fig. 3

**Question FOUR**

a) With the aid of circuit diagram explain the operation of a NAND gate S-R flip-flop (7marks)

b) Describe the reasons why S-R flip flop is not often used in logic families. (3marks)

c) Draw the D-Flip-flop and explain its operation (8marks)

d) State any two applications of Using the D flip-flops (2marks)

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**Question FIVE**

a) With the aid of a diagram explain the operation of a Nand diode logic gate (8marks)

b) State two applications in each case of Decoders and encoders. (4marks)

c) Explain the operation of the circuit in fig.4 (8marks)

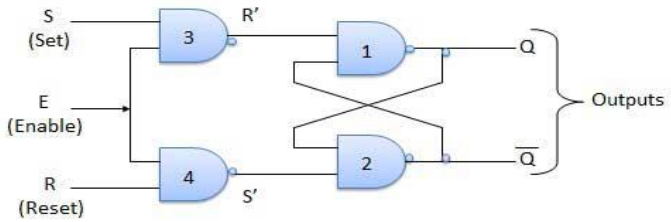


Fig. 4