



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN ELECTRICAL & ELECTRONIC ENGINEERING

EEE 2202: DIGITAL ELECTRONICS II.

END OF SEMESTER EXAMINATION

SERIES: MARCH, 2025

TIME: 2HOURS

DATE: Pick Date Select Month Pick Year

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 any THREE.

Do not write on the question paper.

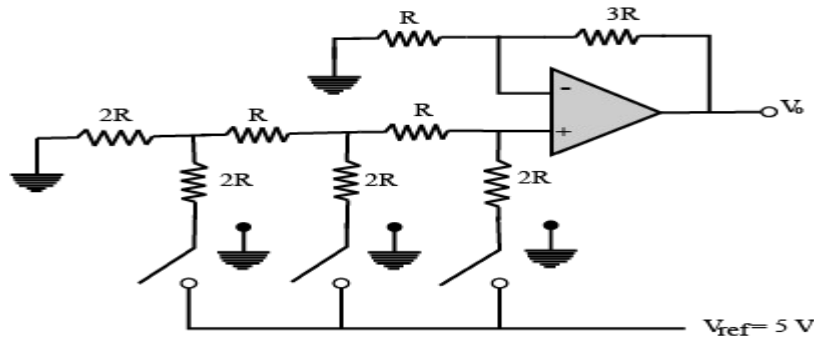
Question ONE

- a) Design and implement a Decimal to BCD encoder (8marks)
- b) State any two applications of Decoders. (2marks)
- c) Draw the truth table and circuit diagram for
 - i. a 4 line to 1 line multiplexer
 - ii. 4line to 2 line encoders (10marks)

Question TWO

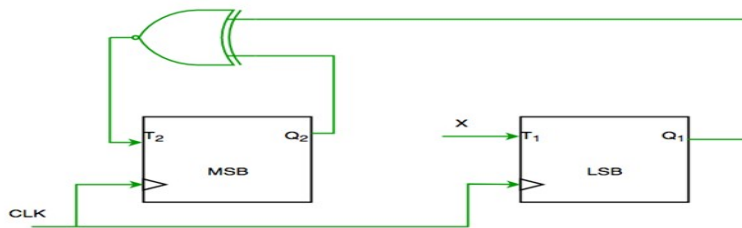
- a) Define the terms as applied in digital converters
 - a) Resolution
 - b) Accuracy
 - c) Step size (3marks)
- b) With the aid of a diagram explain the operation of a digital Ramp (7marks)
- c) An 8-bit DAC produces 10v for the binary digit 10110110_2 . Determine the

- i. Resolution
 - ii. Step size
 - iii. Maximum scale output voltage (6marks)
- d) Figure 1 shows a circuit diagram of aR-2R ladder DAC converter. If $R = 10\text{ K}\Omega$, with binary input 010 Determine the value of the output voltage (V_o) (4marks)



Question THREE

- a) Compare the logics of synchronous counter and ripple counter (4marks)
- b) Consider the partial implementation of a 2-bit counter using T flip-flops following the sequence 0-2-3-1-0, as shown in fig. 1 complete the circuit by determining through design what is to be connected to x (7marks)
- c) Design a 3-bit ring counter and find the mod of the designed counter. (6marks)
- d) State the applications of counters and registers. (3marks)



Question FOUR

- a) i. Differentiate between level triggering and edge triggering siting an example in each case.
- ii. With the aid of a diagram and truth table explain the operation of a NAND gate S-R flipflop (8marks)
- b) i. Define the term race condition
- ii Draw the Master slave diagram and use waveforms to explain its operation. (6marks)
- c) i. Draw the truth table of T -flipflop
- ii.Explain why the D- flipflop is frequently used in digital circuits. (6marks)

Question FIVE

- a) Explain the term volatile and mention an example (2marks)
- b) With the aid of diagrams explain how a word is written and read from a MOS static Ram cell
(6marks)
- c) State any two advantages of DRAM over SRAM cells (2marks)
- d) Using diagrams explain the operation of a 4bit diode ROM. (6marks)
- e) Draw the logic diagram of a static Bipolar cell . (4marks)