



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2009/2010
INSTITUTE OF OPEN LEARNING EXAMINATION FOR THE DEGREE OF
BACHELOR OF INFORMATION TECHNOLOGY

SCT 112: INTRODUCTION TO DIGITAL ELECTRONICS

DATE: Saturday 20th February, 2010

TIME: 11.00 a.m. – 1.00 p.m.

INSTRUCTIONS

Answer question ONE and any other TWO.

QUESTION ONE

- a) Use Boolean algebra to simplify the following expression and name the law applied:

$$Y = AB + \overline{BC} \quad [5 \text{ marks}]$$

- b) Minimize the expression

$$Y = A\overline{BC} + ABC + \overline{ABC} + \overline{ABC} \quad [5 \text{ marks}]$$

- c) Describe noise margin. There is a voltage band for both logic families that is called “indeterminate”. What does this mean? [10 marks]

QUESTION TWO

- a) Give a Boolean expression and the truth table for the following logic gates:
- i) 2 input OR
 - ii) 2 input NAND
 - iii) Buffer inverter [9 marks]
- b) Define a comparator and briefly explain how it works. [11 marks]

QUESTION THREE

- a) What are the basic differences between asynchronous and synchronous sequential circuits? [8 marks]
- b) i) What is the function of an 8- to – 1 multiplexer? [6 marks]

- ii) What does a demultiplexer do? [6 marks]

QUESTION FOUR

- a) Draw the truth table and Karnaugh map for $Y = \overline{A} \overline{B} AB + AB$. What function is this? [10 marks]
- b) Name the various characteristics of digital ICs used to compare their performances. [10 marks]

QUESTION FIVE

- a) Draw the logic circuit for the wired gate given by the Boolean expression:
 $P = \overline{A + B} \cdot \overline{C + D} \cdot \overline{E + F}$ [10 marks]
- b) What is the basic difference between sequential and combinational logic circuits? [10 marks]

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