KENYA METHODIST UNIVERSITY

END OF 1ST TRIMESTER 2010 EXAMINATIONS

FACULTY	**:**	**COMPUTING AND INFORMATICS**
DEPARTMENT	**:**	**COMPUTER INFORMATION SYSTEMS**
UNIT CODE	**:**	**CISY 204**
UNIT TITLE	**:**	**DIGITAL ELECTRONICS**
TIME	**:**	**2 HOURS**

Instructions:

- *Answer question 1 (compulsory) and any other 2 questions.*

Question 1 (compulsory)

a) Convert the following decimal numbers to binary and then the hexadecimal.
   i) 231 (3 mks)
   ii) 197 (3 mks)

b) Design logic circuits using gates to realize these functions.
   i) Y = (A + BC) (B + $\overline{A}$ C) (3 mks)
   ii) Y = $A\overline{B} + \overline{A}\overline{B}$ (2 mks)

c) Find two's compliment of the following binary numbers
   i) 101110 (2 mks)
   ii) 111011 (2 mks)

d) i) What is a multiplexer? (3 mks)
   ii) Construct a 32 x 1 multiplexer using 8x1 and 4x1 multiplexers. (6 mks)

e) i) What are the advantages of dynamic RAMs over static RAMs? (3 mks)
   ii) State three applications of binary counters. (3 mks)

Question 2

a) i) What is a flip-flop? (1 mk)
   ii) Differentiate between synchronous and asynchronous circuits. (2 mks)

b) Simplify the logic expressions using Boolean Algebra:
   i) $Y = A\overline{B} + \overline{A}\overline{B}$ (3 mks)
   ii) A + B(A+B) (3 mks)

c) i) Write the count sequence of a 3-bit down counter. (4 mks)
   ii) Design a ripple counter using flip-flop for this sequence. (4 mks)

d) State three (3) types of digital to analog converters (DACs) (3 mks)

Question 3

a) i) What is a binary Adder? (2 mks)

ii) Design a circuit showing how the two signals A=1010 and B=0111 can be added by parallel full Adders. (7 mks)

b) i) Design a 3-input OR gate. (2 mks)

ii) Prepare a truth table for the above gate. (4 mks)

c) State two applications of multiplexers. (2 mks)

d) Differentiate between SRAM and DRAM. (3 mks)

Question 4

a) Differentiate between:

i) RAM and ROM (4 mks)

ii) UVPROM and EEPROM (4 mks)

b) State five applications of ROMs. (5 mks)

c) What are the disadvantages of dynamic RAMs over static RAMs? (3 mks)

d) Explain briefly 'cache memory'. (4 mks)