MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS
2018/2019 ACADEMIC YEAR
FOURTH YEAR SECOND SEMESTER EXAMINATION
SCHOOL OF SCIENCE
FOR THE DEGREE OF BACHELOR OF SCIENCE IN PHYSICS

COURSE CODE: PHY430
COURSE TITLE: ELECTRONIC CIRCUITRY AND MICROPROCESSORS

DATE:29TH APRIL 2019 **TIME: 0830HRS – 1030HRS**

INSTRUCTIONS

- Answer Question ONE and any other TWO.
- Use of sketch diagrams where necessary and brief illustrations are encouraged.
- Read the instructions on the answer booklet keenly and adhere to them.

QUESTION ONE

a) Convert
   i. 35_{10} to binary
   ii. 010101_2 to decimal (3 marks)

b) State any two characteristics of clocked R-S flip flop (2marks)

c) Evaluate the following using binary digits (4 marks)
   i. 1111_2+1011_2
   ii. $10110_2-01011_2$

d) Use 1's complement to carry out 0110_2-1110_2 (2marks)

e) i) Define the term 'Adders' (1 mark)
   ii) Design half adder using NAND gates and draw its truth table (5 marks)
   iii) State the limitations of half adders (2 marks)

f) i) Define the term' flip flop' (1 mark)

   ii) Draw the logic circuit of a latch flip flop and give its truth table (using NAND gates) (5 marks)

g) i) Define the term computer memory (1 mark)
   ii) State functions of RAM (2 marks)
   ii) State characteristics of ROM (2 marks)

QUESTION TWO

a) (i) State the two main types of RAM (2 marks)
   (ii) Differentiate between the above types (2 marks)

b) (i) What is a microprocessor –Based System (2 marks)
   (iii) Primary Memory (3 marks)
   (iv) Secondary Memory (3 marks)
   (v) Input/output devices (3 marks)

c) Discuss in details, the working of Full Adder logic circuit and extend your discussion to explain a binary adder, which can be used to add two binary numbers. **(5 marks)**

QUESTION THREE

a) Define a Microprocessor and give examples of CPU (4 marks)

b) State the factors to be considered while selecting the microprocessor (3 marks)

c)What are the following in Assembly Language Programming

(i) The debugger (1 mark)
(ii) Machine cycle (1 mark)

d)Give the comment for the following basic microprocessor instructions 8085 microprocessor

(i) MOV

(i) LD
(ii) ADD R

e) Explain briefly how interfacing of the Memory I/O devices to the Microprocessor is done (8 marks)

QUESTION FOUR

a) What are the main differences between microprocessors and microcontrollers? (3 marks)
b) Briefly explain the basic structure of a microcontroller. (4 marks)
c) In general, assembly instructions can be classified as falling into four main groups of operation. List them below and provide an example for each group of operation. (7 marks)
d) What are the functions of a memory address register and status register in a microprocessor? (4 marks)
e) What is the difference of the sequential memory and random access memory? (2 marks)

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