TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MEDICAL ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MEDICAL ENGINEERING

EEP 2351: MICROPROCESSOR SYSTEMS

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: 13 May 2016

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 question ONE (Compulsory) and any other TWO questions.
Do not write on the question paper.

Question ONE

(a)   Name the THREE common types of memory devices

          (3 Marks)

(b)   Explain how read operation takes place from a single core of a magnetic core memory device.

          (4 Marks)

(c)   Name the different types of inputs and outputs in a memory device

          (5 Marks)

(d)   Give THREE examples of electronic disks used as memory devices

          (3 Marks)

(e)   Explain how a microprocessor system solves/implements a specific task.

          (6 Marks)

(f)   Compare and contrast between a microprocessor and a microcontroller

          (4 Marks)

(g)   Give the function of the following registers within a microprocessor.
- i)   Accumulator
- ii)   Flag register
- iii)   IM register
- iv)   HL register
- v)   SP register

          (5 Marks)

Question TWO

(a)   Define the following terms
- i)   Dynamic memory
- ii)   internal memory
- iii)   Cache memory

          (3 Marks)

(b)   A memory device is described as a 32 x 8.
- i)   With the aid of a diagram, describe the internal structure of the device.

          (13 Marks)
- ii)   Explain with the aid of the diagram in 2(b)(i), how the following operations takes place
  - I) Read operation
  - II) Write operation

          (4 Marks)

Question THREE

(a)   Define the following terms as used in microprocessors.
    i)   microcomputer
    ii)   memory map
    iii)   control bus
    iv)   Assembly

(4 Marks)

(b)   During two successive instruction cycles; two control signal Read (RD) and Write (WR) are generated by a microprocessor. If the first instruction is a memory write instruction and the second is to read from a port device, Draw a timing diagram for the two instruction cycles.

(8 Marks)

(c)   Write a program using unsigned binary arithmetic that
    i)   uses two registers A and B to load them with immediate data 83_{10} and 58_{10}
    ii)   The contents of the two registers in (a) above are added together.
    iii)   A third number 140_{10} is then subtracted from the contents of A using immediate addressing and
    iv)   finally the new contents of A are decremented by unity.

(8 Marks)

Question FOUR

(a)   Give any FOUR applications of Random access memory

(4 Marks)

(b)   Figure 1 indicates the contents and addresses of a Random access memory device. If the Data 7E hex is to be written on memory location 04 hex.
    i) Describe the sequence of operation, indicating the conditions on each of the inputs.
    ii) Redraw the diagram indicating the location and their contents after the operation has taken place

Figure 1

(12 Marks)

(c) Compare and contrast between a magnetic bubble memory and magnetic tape

(4 Marks)

Question FIVE

(a) Give TWO advantages of microprocessor systems

(4 Marks)

(b) With the aid of a diagram, explain how to ensure in practice that only the device intended for the data transfer responds when a request is made by the microprocessor for a system having a number of devices connected to the microcomputer highway.

(8 Marks)

(c) Write an assembly language program to perform the following arithmetic operations using two's complement signed binary number representation -65+(-13).

(8 Marks)