



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. (5 Marks)
- i) Accumulator
 - ii) Flag register
 - iii) IM register
 - iv) HL register
 - v) SP register

Question TWO

- (a) Define the following terms (3 Marks)
- i) Dynamic memory
 - ii) internal memory
 - iii) Cache memory
- (b) A memory device is described as a 32 x 8. (13 Marks)
- i) With the aid of a diagram, describe the internal structure of the device. (4 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

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

Address	Data/instructions							
0000	0	1	1	0	0	1	1	0
0001	1	0	0	1	1	0	0	1
0010	1	1	1	1	1	1	1	1
0011	0	1	0	0	0	1	0	0
0100	0	0	0	1	0	0	0	1
0101	0	0	0	0	0	0	0	0
1110	1	1	0	1	1	1	0	1
1111	0	1	1	1	0	1	1	1

Figure 1

- (c) Compare and contrast between a magnetic bubble memory and magnetic tape (12 Marks)
- (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)