15149

B. Tech 5th Semester Examination

Microprocessors (OS)

EC-5011

Time : 3 Hours   **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one question from each of the Sections A, B, C, and D and all the subparts of questions in Section E.

SECTION - A

1. (a) Explain the following terms with reference to a general microprocessor.

   (i) T-cycle (ii) Instruction cycle (iii) Machine cycle (iv) Program status word (v) Memory Address Register (vi) Stack (vii) Program counter (viii) Condition code register.   (8)

   (b) Explain absolute and linear select address decoding. What is fold back memory address?   (6)

   (c) Define:

   (i) Microprogramming and Micro-operations.

   (ii) I/o mapped I/o and memory mapped I/o schemes.   (6)

2. (a) A Hypothetical CPU has a parallel address bus, a parallel databus, a $\overline{RD}$ and a $\overline{WR}$ signals. Two ROMs of size 4k words each and two RAMs of sizes 16k and 8k words, respectively, are to be so connected that they fillup the address space of the CPU as per the memory map

shown in figure below. Assuming that chip select signals are active low,

(i) What is the number of lines in the address bus of CPU?

(ii) Determine the values of addresses x, y, z and W (in HEX).

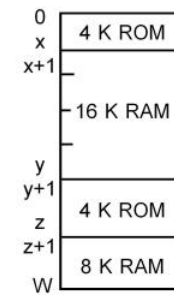(iii) Using a 3-to-8 decoder and some additional gates, draw a circuit for the decoding logic.   (3+4+5=12)

Fig. Q.2(a)

(b) Differentiate between:

(i) Physical, Logical and Virtual memory.

(ii) Primary and secondary memory.   (4+4=8)

SECTION - B

3. (a) Distinguish between:

   (i) Maskable and non-maskable interrupt.

   (ii) Hardware and Software interrupt.

   (iii) Vectored and non-vectored interrupt.   (12)

   (b) Draw and explain the timing diagram of memory read cycle of 8085 microprocessor.   (8)

4. (a) Draw the block diagram of 8085 microprocessor and explain the working of each unit in detail.   (10)

   (b) Describe the demultiplexing of lower address cum data lines of 8085 microprocessor using a suitable schematic diagram.   (10)

SECTION - C

5. (a) Write a program using 8085 assembly language to save information of status flags in a RAM location and output the same on an output port having address 2010H. (8)

(b) Explain the following 8085 instructions:

(i) SPHL (ii) XCHG (iii) PCHL (iv) CPO (v) RAL (vi) SHLD.
(12)

6. (a) Explain the instruction format of 8085 microprocessor with suitable example. (6)

(b) Specify the register content and flag status after the following program is executed:

MVI B, B9H

MVI A, 47H

ADD B

ORA A (6)

(c) How many times the given loop will be executed? What will be the contents of HL pair when the program control reaches HLT instruction?

```
        MVI   A, 00H
        LXI   H, 5003H
LOOP:   DCX   H
        DCR   A
        JNZ   LOOP
        HLT
```
(8)

SECTION - D

7. (a) Explain the control word in 8255 PPI and mention its purpose and format. What are different modes of operation in 8255? (10)

(b) Describe the process of DMA using chip 8257 in 8085 microprocessor. Mention the steps involved. (10)

8. (a) Draw and explain the Block diagram of 8253 programmable timer. (10)

[P.T.O.]

(b) Explain the different EOI commands and priority modes of 8259 PIC. (10)

SECTION - E

9. (a) Mention the instruction which takes the minimum possible time to clear accumulator.

(b) Differentiate between compiler and assembler.

(c) Name two instructions of 8085 microprocessor that can be used to input/output data on a memory-mapped I/O port.

(d) Write the sequence of commands using 8085 instruction set which when executed makes carry (cy) and zero (z) set(=1) at the same time.

(e) To which location does the RST 6 instruction transfer the program execution in 8085 microprocessor?

(f) An 8085 microprocessor based system uses a 4k×8 bit RAM whose starting address is AAOOH. Find out the address of the last byte in this RAM.

(g) The following program starts at location 0100H.

```
LXI   SP, 00FFH
LXI   H, 0102H
MVI   A, 20H
SUB   M
ORI   40H
ADD   M
```

Find out the contents of Accumulator when the program counter reaches 0109H.

(h) The contents of Register B and Accumulator A of 8085 microprocessor are 49H and 3AH respectively. Find the contents of accumulator and the status of carry flag (cy) & sign flag(s) after the execution of SUB B instruction.

(i) What do you mean by WAIT states? What is its need?

(j) What are Tri-state devices? Why are they essential in bus-oriented system? (2×10=20)