B.E.(EE) Part-III 6th Semester Examination, 2012(May)

Microprocessor and Interfacing

(EE605)

Time: 3 hours Full Marks: 70

Answer question no. 1 and any two from the rest of the FIRST HALF and any three from the SECOND HALF.
Two marks are reserved for neatness in each half.

FIRST HALF

1. Fill-up the blanks with appropriate words: (2+2+2+1+2+2=11)
   (a) The two 16-bit registers of the 8085 processor are _____ and _____.
   (b) The two pins assigned for serial input/output are labeled as _____ and _____.
   (c) The signals _____ and _____ are used for responding to slower and faster acting peripherals respectively.
   (d) The oscillator frequency to the 8085 clock input is _____.
   (e) The 8085 microprocessor relinquishes its hold of the buses in the _____ _____ mode.
   (f) The undesirable presence of address bits in the multiplexed address/data bus gives rise to _____ _____.

2. (a) What do you mean by partial decoding and absolute decoding?
   (b) Design an interfacing circuit with two 6116(2K x8RAM)ICs with 8085 using 74LS138 decoder such that the starting address assigned to them are 8000H and 9000H respectively. (3+8)

3. (a) Draw the schematic diagram of the 8085 interrupts showing their activation signals and their priority.
   (b) With which PPI chip would you associate the term BSR mode and what does it imply? (8+3)

4. (a) Draw the interfacing circuit to activate the ADC0809 with the 8085 microprocessor. Show all the handshaking signals.
   (b) What functions does the 8253 programmable timer do in the Mode-0 and Mode-1? Explain with the timing diagrams. (6+5)

5. Write short notes on any two of the following topics: ($5\frac{1}{2} \times 2 = 11$)
   (a) The schematic representation of the 8086 microprocessor.
   (b) The timing diagram to fetch an instruction from memory and how bus contention is caused.
   (c) The schematic representation of a decoder block and its use in microprocessor circuitry.
   (d) The application of the D F/F in microprocessors.

SECOND HALF

6. (a) Express 96(D) in signed binary form.
   (b) Add 4AH to 56H and comment on the status of the 'sign' flag.
   (c) Name one 8085 assembly language instruction each that (i) does not affect any flag (ii) affects all flags.
   (d) What is the function of the instruction DAA? Explain your answer with an example.
   (e) Name the registers of Intel 8085 whose contents cannot be accessed / altered by the user. What is the utility of such registers? (2+2+2+2+3)

7. (a) What does the following program segment do?

```
LXI H, 4051H
MVI B, 0AH
MVI A, 01H
LOOP: MOV M,A
INR A
INX H
DCR B
JNZ LOOP
HLT
```

(Show all intermediate steps used to arrive at the result.)

(b) Write an 8085 assembly language program to store the content of the flag register in memory location 2000H.

(c) Write instructions to set and reset the 'Carry' (C) flag. (5+4+2)

8. (a) Write an 8085 assembly language program to count the number of '1's and '0's in the byte stored in register D and store them in memory locations 3000H and 3001H respectively.

(b) If the stack pointer is initialized at 4000H and the PUSH D instruction is executed, which two memory locations carry the contents of D and E registers respectively?

(c) What are the maskable and non-maskable interrupts in Intel 8085? Which of these is 'non-vectored' and why? (5+2+4)

9. (a) Draw the block schematic for reading the output of a speed encoder mounted on the shaft of a motor by a 8085-based system. The encoder produces a variable number of pulses per second depending on the speed of the motor. Use the encoder output as the clock of a programmable timer chip for measuring the speed. Assume that the pulse width and the frequency of the signal generated by the encoder is fixed and known. Add any other component you require. Write the 8085 assembly language program to execute the above job.

(b) Explain the function of the instructions SIM and RIM with the help of suitable examples. (7+4)

10. (a) Sketch the serial output waveform for the ASCII character '5' when it is asynchronously transmitted at 9600 Baud with two stop bits and even parity.

(b) Find the 8251A mode word and command word for the above example with transmit clock speed of 153.6 KHz.

(c) What is the content of the accumulator after the following 8051 assembly language program segment is executed? Explain your answer.

```
MOV A, #FE H
ADD A, #02 H
JC NEXT
NOP
.
.
.
NEXT: MOV A, #54 H
```

(d) Write a program in 8051 assembly language to add the content of two consecutive memory locations in external memory and store the result in the next memory location. (2+4+2+3)