25/3/13

COMP 5-3 (RC)

T.E. Computer Engineering (RC) (Semester – V) Examination, May/June 2013
MICROPROCESSOR AND MICROCONTROLLER

Duration : 3 Hours | Total Marks : 100

Please Enter your Examination Seat No.

Instructions : 1) ***Assume*** *suitable data* ***if necessary***.
2) *Answer* ***any five*** *questions; attempt at least* ***one*** *question from* ***each*** *Module.*
3) ***Draw*** *neat diagrams* ***if required***.
4) *Write question numbers* ***legibly*** *while answering.*
5) *Write description for the questions based on the marks* ***allotted***.

MODULE – I

1. a) The contents of 8086 registers are as given below. Find the physical addresses for the following instructions

D470H in DS	2D91H in SS	1002 in ES
2111H in CS	0030H in BP	0040H in SP
0050H in SI	0060H in DI	

Instructions :

MOV AL, [BP]
MOV CX, [SP]
MOV BL, [BP+SI]
MOV CS: [DI],AL **6**

b) Consider the following data definition in data segment :
Var1 DB20 DUP (2, 3, 5 DUP (11, 12))
This statement will (pick one) :
A) Allocate 150 bytes in memory
B) Allocate 180 bytes in memory
C) Allocate 75 bytes in memory
D) Allocate 240 bytes in memory
Show the memory map for above data definition. **4**

P.T.O.

c) Give 8086 code that performs each of the following instructions :
   i) Write the contents of register CL into the I/O port with address 50H.
   ii) Write the letter 'A' into the I/O port with address 1A52H.
   iii) Read a byte from the I/O port with address 3FE2H and store it in DL.
   iv) Move the byte content of I/O port with address 30H to the I/O port with address 60 H. **6**

d) What are instruction prefixes in the instruction set of the 8086 ? Explain their usage with appropriate examples. **4**

2. a) Explain the usefulness of the following instructions in 8086
   i) LOCK ii) TEST
   iii) XLAT iv) LES. **6**

   b) Write 8086 ALP program to sort set of N unsigned 8 bit numbers in descending order using selection sort. Add proper comments in the program. **8**

   c) Draw neat timing diagram for memory read and memory write operation with all signal used in minimum mode of 8086. **6**

MODULE – II

3. a) Explain the functionalities provided by the following interrupt service routines with examples.
   int 21h
   int 2h
   int 3h
   Also write a program segment to input and output strings using int 21h. **12**

   b) With block diagram explain the operation of I/O processor. **8**

4. a) Explain the interface of 8086 and 8087 with clear functioning of RQ/GT pins. **8**

   b) Convert decimal number 225.125 into the short real, long real and temporary real representation used by the 8087. **4**

   c) Write a program to compute the real roots of the quadratic equation $ax^2 + bx + c = 0$. Using 8087 co-processor instructions. Use appropriate comment to explain the logic of the program written. **8**

MODULE – III

5. a) Draw a circuit for interfacing an 8×8 matrix keyboard to 8086 through 8255A. Write 8086 ALP to identify a key being pressed. **10**

   b) Discuss the organization and architecture of 8255 programmable peripheral interface IC with a functional block diagram. **10**

6. a) Program 8254 to generate
   Interrupt signals at the rate of 4 KHz from the clock of 1MHz.
   10KHz square wave from 100 KHz clock. **10**

   b) With the help of neat block diagram explain the working of USART. **10**

MODULE – IV

7. a) Draw the pin diagram of 8051. Explain the function of each pin in detail. **8**

   b) Explain the interrupt structure of 8051. **6**

   c) Explain the bit format of TMOD and TCON register in 8051. **6**

8. a) Explain the concept memory bank in 8086. With a neat diagram with appropriate signals used for interfacing memory, describe how memory is accessed in 8086. **8**

   b) Show how the 80286 constructs physical addresses in its real address mode and in its protected virtual address mode. **8**

   c) Explain different descriptor tables used in 80386 system. **4**