COMP 5 – 3 (RC)

T.E. Computer Engineering (Semester – V) (RC)

Examination, Nov./Dec. 2015

MICROPROCESSORS AND MICROCONTROLLERS

Duration : 3 Hours | Total Marks : 100

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) Show in tabular form, the default and alternate segment registers for different types of memory reference with appropriate instruction examples. 4

   b) Describe the response of the 8086 to the following five primitive string instructions MOVS, CMPS, SCAS, LODS and STOS. 6

   c) Tabulate common signals, minimum mode signals, and maximum mode signals. Also mention their functions and types. 10

2. a) Write an assembly language program in 8086 to arrange the given set of N integer numbers in ascending and descending order. Use suitable sorting algorithm and document the program with comments and assumptions. 8

P.T.O.

b) The contents of 8086 registers are as given below. Find the physical addresses for the following instructions (values are in hexadecimal)

D470H in DS 2D91H in SS 1002H in ES 8800H in BX
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
MOV AX, [DI]
MOV DX, [BX + SI]
```

Show physical address calculations clearly. 6

c) With the help of neat timing diagram explain the read cycle of 8086. 6

Module – II

3. a) Describe the operation performed by the each of the following 8087 instructions.

```
fld tax_rate
fmul inflation_factor
fsqrt
fldpi
fstsw  check_Answer
fptan
```

6

b) Explain the control word and status word of 8087. Describe how status register used for decision making in floating point number computation. 8

c) Write 8086/8087 procedures to implement the following trigonometric ratios

i) sin (x)
ii) cos(x)
iii) sec(x)
iv) Cosec(x). 6

4. a) Write 8086 user defined libraries to implement input and output of positive integer number. Use appropriate comments to explain the code written. 8

   b) With a block diagram, explain the pin connections between 8086 microprocessor and 8087 co-processor. 8

   c) Explain the significance of I/O processor. Also, list out different modes of operation of I/O processor. 4

Module – III

5. a) Draw a circuit for connecting two seven segment LEDs to Port-A of 8255 and displaying decimal values with the help of program segment. 10

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

6. a) Explain the mode-1 operation of 8255A. 10

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

Module – IV

7. a) Design an interface between 8086 and two chips of 32K× 8 EPROM and two chips of 32K × 8 RAM. Select the starting address of EPROM suitably; the RAM address must start at 00000H. Use address decoder (74LS138/74LS139) for selecting memory modules. 10

   b) Show how the 80286 constructs physical addresses in its real address mode and in its protected virtual address mode. 10

8. a) Describe the function and format of the following SFRs TCON,PCON, SCON, TMOD. 10

   b) What are the sources of interrupt in 8051 microcontroller ? Which SFRs are used to control operation of interrupt system ? Explain how bits in SFR used in configuration. 10