T.E. (Comp) Semester – V Examination, May 2010
(Revised Course)
MICROPROCESSORS AND MICROCONTROLLERS

Duration : 3 Hours   Total Marks : 100

Instructions : *1) Answer **any five full** questions with atleast **one** question from **each** Module.*

*2) **Assume** suitable data, if necessary.*

*3) **Draw** figure **whenever** required.*

MODULE – I

1. a) With a neat diagram, explain the organization of the 8086 microprocessor. **8**

   b) What are instruction prefixes in the instruction set of the 8086 ? Explain their usage with appropriate examples. **6**

   c) Explain the advantages and disadvantages of a segmented memory model like that of 8086 microprocessors. **4**

   d) Write the differences between the following instructions : **2**

   i) MOV CX, 437 AH and   MOV CX, [437 AH]

   ii) MOV BL, 437 AH and   MOV BL, DS : BYTE PTR [437 AH].

II. a) With the help of an example, describe the action performed by microprocessor 8086 for each of the following instructions : **6**

   AAM

   CMPSB

   IMUL

   ROL

b) Explain what operation is performed by the following instructions :

   SHL BYTE PTR [0400H], CL

   MOV [BX] [DI] + 4, AX

   XLAT

   XTHL

   PCHL

c) Write an 8086 ALP program to sort set of N unsigned 8 bit numbers in
   descending order using selection sort. Add proper comments in the program.   9

MODULE – 2

III. a) While considering the reset condition as a reference show how will the stack
    condition of 8087 co-processor change after three push operations with
    appropriate diagram.   4

   b) Convert the decimal number 2345.5625 to binary, normalized binary, long-real,
      and temporary real format and explain why are most floating point numbers are   6
      approximations.

   c) Write a program to compute the roots of the quadratic equation $ax^2 + bx + c = 0$.
      Using 8087 co-processor instructions, use comments to explain the logic and
      assumptions.   10

IV. a) Explain the architecture of the 8087 floating math co-processor with a neat   7
    diagram. Highlight the host processor-coprocessor interface.

   b) Briefly describe the conditions cause the 8086 to perform each of the following
      types of interrupts. Type 0, Type 1, Type 2, Type 3 and Type 4.   5

   c) Implement the external procedures for inputing and outputing strings through
      the keyboard. (Use interrupt services and appropriate comments).   8

MODULE – 3

V. a) Interface a 4×4 hex keyboard to 8255. Write a program which will detect key   7
   closure and store key in register AL.

   b) Draw the interfacing diagram between 8086 CPU and 8255 with 8 LEDs and 8
      SPDT switches. Also write a program in 8086 assembly language to read the
      switch status and display it on the LEDs. Add proper comments in the   7
      program.

c) Two 8255 PPI devices interfaced to 8086 microprocessor to read. 16 bit data, show interface and write assembly language program. 6

VI. a) Interface an ADC to 8086 and demonstrate the BSR mode of 8255 operation. Write 8086 ALP to acquire 100 data by polling. 10

b) Explain a method of measuring the period between two events (events generates pulses) using 8254. 6

c) Describe different modes of communication supported by 8251. 4

MODULE – 4

VII. a) Design an interface between 8086 and two chips of 16K × 8 EPROM and two chips of 32K × 8 RAM. Select the starting of EPROM suitably, the RAM address must start at 00000H. 10

b) Describe the improvement of 80486 over 80386. 6

c) List the features of protected mode operation. 4

VIII. a) Describe the internal architecture of 8051 with neat block diagram. 10

b) Explain the timer registers 8051. 4

c) Describe TCON and TMOD function registers. 6