[Total No. of Questions : 8]

T.E. (Comp.) (Semester - V) (RC) Examination, Nov./Dec. - 2011

MICROPROCESSOR AND MICROCONTROLLER

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) The contents of 8086 registers are as given below. Find the physical addresses for the following instructions. [6]

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

b) Consider the following data definition in data segment: Var1 DB 15 DUP (2, 3, 5 DUP (11, 12))

This statement will (pick one):

i) Allocate 150 bytes in memory.
ii) Allocate 180 bytes in memory.
iii) Allocate 75 bytes in memory.

Show the memory map for above data definition. [4]

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 60H. [6]

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

P.T.O.

Q2) a) Write an 8086 ALP to search for a given 16 bit value using binary search in an array of 16 bit numbers, which are in ascending order. Message should be displayed on the CRT indicating whether the search was a failure or a success. If it is a success case, the position of the element in the array is to be displayed. Use appropriate interrupt services. [10]

b) Discuss the segmented memory organization of the 8086 microprocessor. What is a logical address and physical address? Give advantages and disadvantages of segmented memory. [6]

c) Draw the internal block diagram of 8086 microprocessor. [4]

MODULE - II

Q3) a) Convert the decimal no 2345 . 5625 to binary, normalized binary 'short real, long real and temporary real formats. Why all most floating point numbers actually approximations. [6]

b) Show how a coprocessor can be connected to an 8086 operating in maximum mode with all necessary interfacing signals. [6]

c) Write an 8086 - 8087 assembly a language program to prove the following identity: $\sin^2(\text{theta}) + \cos^2(\text{theta}) = 1$ where theta is angle in degrees. [8]

Q4) a) Develop a library for inputting and outputting unsigned integer numbers and also explain the concept of using this library in other programs. [12]

b) What is I/O processor 8089? Describe the need of that processor in 8086 architecture. [8]

MODULE - III

Q5) a) The PPI 8255 given in the figure 1 below is configured as follows

Port A - input port

Port B as output port

And all bits of the C port are output.

i) find the port addresses assigned to A, B, C and control register.

ii) find the control byte for this configuration.

iii) program segment which inputs data from port A and send it to both ports B and C. [10]

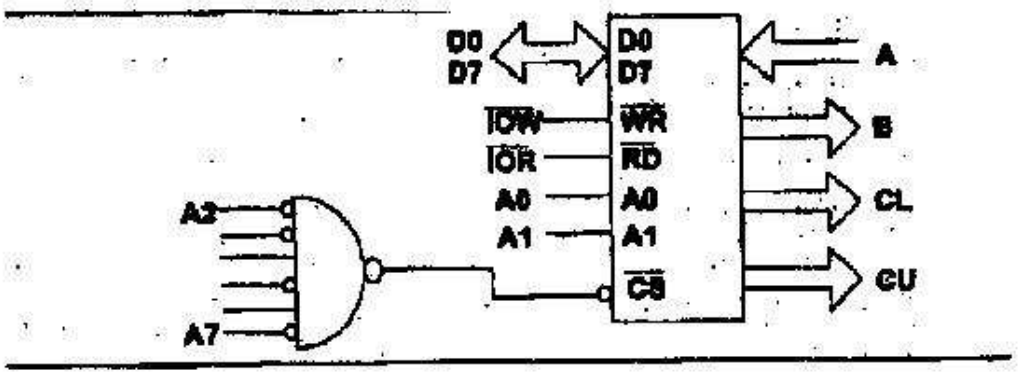

Figure 1 8255 configuration

b) Write 8086 program to generate

i) 9600 pulses with a clock of 3.072 MHz and

ii) 1 KHz square wave with a clock of 2 MHz using 8254.

Make suitable assumptions. **[6]**

c) How do you latch and read the count values in the middle of the count sequence in one of the counters of 8254. **[4]**

Q6) a) The figure 2 given below shows the connection between 8255 and printer. Write a program to print the message "Welcome to Microprocessor and Microcontroller programming $", where $ indicates the terminator for the message to be printed. In the figure 2 OBF - Output Buffer Full, ACK - Acknowledgement. **[10]**

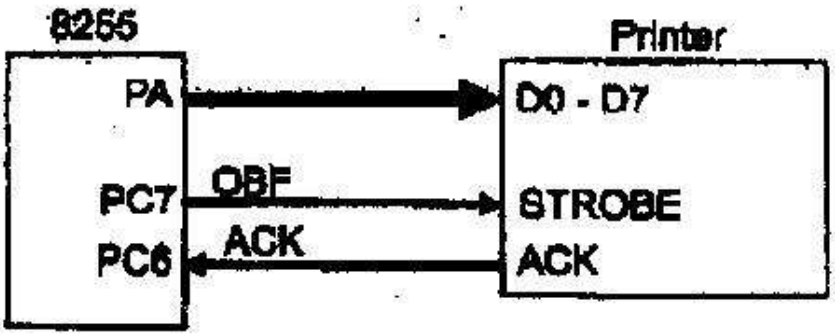

Figure 2 Connections between 8255 and Printer.

b) Draw the block diagram of 8251 and explain in brief, how synchronous communication is different from asynchronous communications. **[10]**

MODULE - IV

Q7) a) Draw the pin diagram of 8051. Explain the function of each pin in detail. **[8]**

b) Explain the memory map of 8051 also explain how external memory is interfaced to 8051. **[8]**

c) Explain the internal and external interrupt supported by 8051. **[4]**

Q8) a) IT is required to interface two chips of 32K X 8 ROM and four chips of 32K X 8 RAM with 8086, according to following memory map

ROM1 and 2	F0000H - FFFFFH
RAM1 and 2	D0000H - DFFFFH
RAM3 and 4	E0000H - EFFFFH

Show the implementation of this memory system and memory map with address bits configuration. **[10]**

b) Distinguish the real, protected and virtual real modes of 80386. **[4]**

c) List the major hardware and software features that 80286 microprocessor has beyond those in the 8086. **[6]**