B. Tech.

(SEM. VI) EXAMINATION, 2006-07

MICROPROCESSOR & ITS APPLICATION

Time : 3 Hours] [Total Marks : 100

Note : (1) Attempt all questions.
(2) Make and state appropriate assumptions where necessary.

1 Answer any four parts : 5×4=20

(a) What is a microprocessor? When it is said that a certain microprocessor is a 32 bit microprocessor, what does it exactly mean? Using this indicator, classify the common Intel microprocessors from earliest history. How many pins does 8086 have? Give the number only.

(b) What are the commonly used alpha-numeric codes in a computer? Why are such codes needed? Compare the codes you have listed.

(c) How many segment registers are provided in 8086? Are so many required? Justify.

(d) Do you agree with the following statement? “8086 may have 64K segments. Each segment may be upto 64 kByte. Thus physical memory address space goes upto 64K x 64k Byte = 4 G Byte.” Explain your answer.

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(e) What are advantages of having separate “Bus Interface unit” and ‘Execution Unit’? Are there any disadvantages? Do you think that it may help if one more ‘Execution unit’ is added to 8086?

(f) Draw a schematic internal block diagram of 8086 and label its parts clearly.

2 Answer any four parts:

(a) From the point of view of internal execution distinguish between a JMP and a CALL instruction. Explain the execution sequence for both (Please do not answer from usage point of view like “CALL is used for subroutine call, whereas........” etc.)

(b) Write an assembly language program for 8086 to find out the largest among 25 members (16 bit integers) stored in memory. Include comments in your program.

(c) The following hypothetical program runs in a 8086. What will be the contents of registers AX, BX and SP after that?
   MOV AX, 2037 H
   MOV BX, 0543 H
   MOV SS, AX
   MOV SP, BX
   PUSH AX
   PUSH BX
   POP AX
   ADD AX, BX

(d) With an example, explain the use of LOOP instruction.

(e) There are a few ‘ASCII Adjust’ instructions in 8086. List them. Explain the function and utility for any two of them.

(f) How BCD numbers are handled in 8086? What are the types of instructions used?
3 Answer any four parts: \(5 \times 4 = 20\)

(a) Sketch the memory read Bus Cycle timings for 8086. Will there be any difference in case of 8088?

(b) From pin description, it seems that 8086 has only 16 AD lines i.e. AD0-AD15. The physical address space however, is larger than \(2^{16}\). How this contradiction is handled? Explain with a neat diagram.

(c) Can 8087 be used as an independent processor? Compared to 8086, does 8087 have a separate (i) address space, (ii) instruction set? Explain.

(d) Write a short note on 8284A. Is the RESET in 8086 synchronous or asynchronous?

(e) Explain the floating point number formats used in a PC with 8087. What are the advantages and disadvantages of using floating point formats?

(f) Write a short note on 8086 status pins in Maximum Mode.

4 Answer any two parts: \(10 \times 2 = 20\)

(a) What is interrupt driven data transfer? Is it a form of programmed data transfer or not? While writing an interrupt service subroutine, what special features are usually incorporated extra in comparison to a normal subroutine? Justify. What is the difference in execution of RET and IRET instructions?

(b) Give the Bus Cycle timing diagrams for IN and OUT instructions. How are they different from comparable MOV instructions? Can MOV instruction be ever used for I/O operation? If yes, what the I/O type is then called? If no, why not?

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(c) (i) Interfacing Dynamic RAM is more complicated compared to static RAM. Then why are they used at all?
   Is static RAM non volatile? What are the advantages of EEPROM over static RAM and EPROM?
   Why are the Basic Monitor program often loaded in ROM/PROM/EPROM/EEPROM?
(ii) Is DMA faster than interrupt driven data transfer? Justify. Is it necessary that the main micro processor remains idle during DMA?

5 Answer any two parts:
(a) An 8255A is attached to 8086 with port-A address 04H. Three traffic lights RED, YELLOW and GREEN are connected to port-C pins PC0, PC1 and PC2 respectively. Write a program in detail including initialization parts so that the lights repeat in a fixed sequence and listed below:
   RED: 10 units of time
   YELLOW: 01 unit of time
   GREEN: 10 units of time
   Add comments to your program
(b) Explain the different modes of operation for 8253. In each case include the function of the GATE signal.
(c) What type of device identification technique is used when a 8259 is used:
   (i) vectored interrupt
   (ii) hardware polling or
   (iii) Software polling? Justify.
   How would you connect interrupting devices to 8086 through 8259? Explain the initialization with a neat connection diagram.