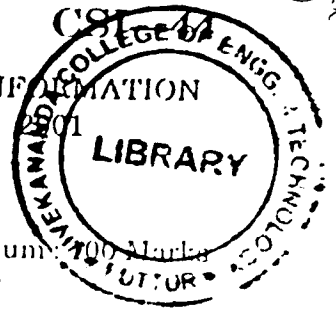(Pages 2)

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FOURTH SEMESTER B.E. (COMPUTER SCIENCE ENGINEERING/INFORMATION SCIENCE ENGINEERING) DEGREE EXAMINATION, MARCH 2001

MICROPROCESSORS

Time : Three Hours

Maximum : 100 Marks

Answer any five full questions.
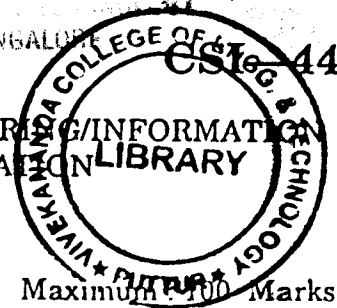*All questions carry equal marks.*

1. (a) Explain the segment registers and their purpose in the operation of the microprocessor.

   (10 marks)

   (b) Explain the various flags of 8086.

   (10 marks)

2. (a) Explain with examples, the instructions to perform PUSH and POP operations.

   (10 marks)

   (b) Write the 8086 instructions which will perform the indicated operation :
       (i) Adds 07 H to DL.
       (ii) Multiply AL times BL.
       (iii) Decrements SP by one.
       (iv) Inverts the lower 4 bits of BL but does not affect the other bits.

   (5 marks)

   (c) Explain DAA instruction with examples.

   (5 marks)

3. (a) Explain MOVS instruction with examples.

   (5 marks)

   (b) Explain with examples the intra segment call instruction.

   (5 marks)

   (c) Write an 8086 assembly language program to evaluate the expression
       $W = X * (X + Y - Z)$, where W, X, Y and Z are memory locations.

   (10 marks)

4. (a) What are the advantages of macro over subroutines ? Generate a table of squares using macros, where the result is less than 255.

   (10 marks)

   (b) Write an assembly language to sort in ascending order using insertion sort algorithm, given a set of 16-bit unsigned numbers in memory.

   (10 marks)

5. (a) Draw the functional pin diagram and briefly explain the pins of 8086. (10 marks)

   (b) Explain I/O read machine cycle of 8086 with timing diagram. (10 marks)

6. (a) Explain 8086 memory interface with a suitable example. (10 marks)

   (b) Classify the different types of memories. Discuss the advantages and disadvantages of each.

   (10 marks)

Turn over

7. (a) Describe the action taken by 8086 when

    (i) NMI pin is activated.

    (ii) INTR pin is activated. (10 m

(b) Describe the various types of software interrupt instructions. (10 m

8. (a) Explain mode 0 and mode 1 of 8255. Give the applications of 8255. (10 m

(b) Explain the interface of ADC 0804 with the microprocessor through 8255. (10 m

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FOURTH SEMESTER B.E. (COMPUTER SCIENCE ENGINEERING/INFORMATION SCIENCE ENGINEERING) DEGREE EXAMINATION

MICROPROCESSOR

37

Time : Three Hours   Maximum : 100 Marks

Answer any **five** *questions.*
All questions carry equal marks.

1. (a) Describe with neat diagram the architecture of microprocessor 8086.
   (b) Explain with examples, the execution of the following instructions :—
       (i) CMC ; (ii) STD ; (iii) DAA ; (iv) SAHF ; (v) AAA.

2. (a) Explain with examples, various addressing modes of 8086 microprocessor.
   (b) How following lines work ? Explain :
       (i) $\overline{BHE}/S7$; (ii) TEST ; (iii) LOCK ; (iv) $\overline{DEN}$; (v) DT/$\overline{R}$.

3. (a) Write an assembly program to sort ten 8-bit numbers.
   (b) Write an assembly program to find out odd and even numbers of an array. Store the result in separate arrays.

4. (a) What is interrupt vector table ? Explain how this is used in branching to interrupt service routines.
   (b) What is macro ? How it is different from subroutine ? Explain.

5. (a) Explain, with block diagram, clock generator 8284.
   (b) Describe with timing diagram, read and write cycle of 8086.

6. (a) How 4 × 4 keyboard is interfaced with 8086 microprocessor ? Explain with sketch and flowchart.
   (b) Explain with neat diagram and flowchart interfacing of stepper motor to microprocessor.

7. (a) With block diagram, explain 8259.
   (b) Explain the working of 8254 with block diagram.

8. Write short notes on the following :—
   (a) Multiplexing and demultiplexing of address and data bus.
   (b) Type-0 to type-4 exceptions.
   (c) D.C. motor speed control using microprocessor.
   (d) Max mode of operation of 8086.

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Reg. No.

CSI44

Fourth Semester B.E. Degree Examination, August 2001

CSE/ISE

Microprocessors

Time: 3 hrs.]   [Max. Marks: 100
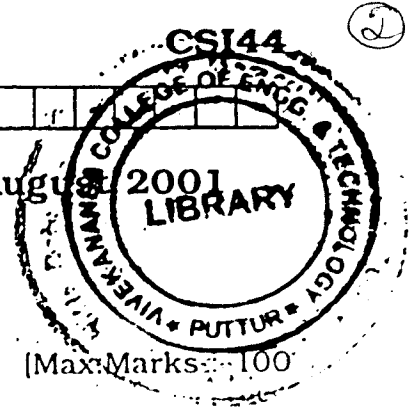
Note: *Answer any FIVE full questions.*
All questions carry equal marks

1. (a) With a block diagram of the programmer's model of 8086/8088, bring out the salient features of 8086/8088.   (10 Marks)

   (b) What is segmented memory addressing? Why do you think 8086/8088 uses segmented memory addressing? Explain how segmentation helps in relocation.   (2+2+6 Marks)

2. (a) Explain the following addressing modes of 8086/8088
      i)   Direct
      ii)   Base-relative-plus-index
      iii) Register relative
      iv)   Immediate addressing   (4 X 3 = 12 Marks)

   (b) Explain how the stack is used for the subroutine call/return mechanism.   (8 Marks)

3. (a) Explain the "MOVS" instruction.   (10 Marks)

   (b) Implement the "MOVS" instruction through a set of other (non-move string) instructions.   (10 Marks)

4. (a) "File1.asm" contains a program segment which calls a subroutine (procedure) in "file2.asm" Give the necessary declarations in File1.asm and "File2.asm" (to make the subroutine of file2.asm available to file1.asm which is not locally available) and the assembling and linking to obtain the executable file.   (12 Marks)

   (b) Explain the function of "local label" in macro definitions.   (8 Marks)

5. (a) Identify the function/s of the following pins of 8088 processor
      i) ALE ii)$\overline{INTA}$ iii) $IO/\overline{M}$ iv)$READY$ v)$RESET$ vi) NMI (6 X 2 = 12 Marks)

   (b) With a diagram show how the multiplexed (Address/data) bus of 8088 is demultiplexed using transparent latches.   (8 Marks)

6. For 8088 (in minimum mode), explain with a diagram the connections required to interface 8 chips (RAM) of 4K X 8, to have the starting address located at 00000H. The memory chips have $\overline{rd}.\overline{wr}$, $\overline{cs}$, address and data buses. Use suitable decoder for addressing decoding   (20 Marks)

7. (a) The 8254 timer/counter is a 24 pin chip with the following pins. Show how it can be connected to 8088 (in I/O mapped I/O) to have the counter address located at $00H, 01H, 02H$ and the control word register addressed located at $03H$

Data Lines	8
$\overline{rd}, \overline{wr}, \overline{cs}$	3
3 sets of (CLK. gate. out pins)	$3 \times 3 = 9$
A1. A0	2
ru. GND	2

Total	24

(10 Marks)

(b) Explain briefly the interrupt structure of 8088/8086   (10 Marks)

8. Write short notes on
   i) Memory mapped I/O Vs I/O Mapped I/O
   ii) Jump group of instructions

                                (2 × 10 = 20 Marks)

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Reg. No. ☐☐☐☐☐☐☐☐☐☐

Fourth Semester B.E. Degree Examination, February 2002

Computer Science/Information Science and Engineering

Microprocessors

Time: 3 hrs.]

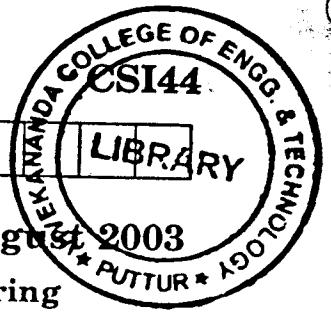[Max.Marks : 100

Note: *Answer any FIVE full questions.*

1. (a) With an aid of a functional schematic, explain the architecture of 8086 micro-processor. (10 Marks)

   (b) With illustrative example, explain the significance of the following instructions.
   i) DAA   ii) STD   iii) CMC   iv) AAA   v)SAHF (10 Marks)

2. (a) List the different addressing modes available in 8086 assembly level language programming. Explain any three of them, with suitable examples. (10 Marks)

   (b) Discuss the role of the following signals in 8086 based micro computer.
   i) TEST   ii) $\overline{BHE}/S7$ iii) LOCK   iv) $DT/\overline{R}$ v) $\overline{DEN}$ (10 Marks)

3. (a) Write an assembly language program to arrange the given set of ten 2-digit number in descending order. (10 Marks)

   (b) Develop an assembly language program to evaluate the expression
   P = Q * (R / S -T) +U where P, Q, R, S, T and U represent the memory locations. (10 Marks)

4. (a) Discuss how interrupts are handled in 8086 based micro-computers. Further indicate the significance of interrupt vector table, with illustrative examples. (10 Marks)

   (b) Compare and contrast the concept of macros and subroutines in micro computers. Further, develop a macro to generate all the cubes less than 255. (10 Marks)

5. (a) With a functional block schematic, explain the pin configuration and functions of each signal in the clock generator 8284. (10 Marks)

   (b) Explain the I/O. Write machine cycle of 8086 instruction, with timing diagram. (10 Marks)

6. (a) With the aid of a neat sketch and flow chart, describe how a 4 × 4 keyboard is interfaced to 8086 based micro computer. (10 Marks)

   (b) With regard to a micro computer explain the memory hierarchy. Further, enlist the salient features of each memory unit, with their suitability of usage. (10 Marks)

7. (a) Explain the working of 8254 with block diagram. (10 Marks)

   (b) Discuss the hardware and software requirements for interfacing an ADC to a 8086 based micro computer, using 8255. (10 Marks)

8. Write short notes on the following. (4 × 5=20 Marks)
   i) Segmentation in 8086.
   ii) Conditional assembly.
   iii) DRAM.
   iv) Address decoding.

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Reg. No. ☐☐☐☐☐☐☐☐☐☐

Fourth Semester B.E. Degree Examination, July 2002

Computer Science/Information Science and Engineering

Microprocessors

Time: 3 hrs.]   [Max. Marks : 100

Note: *Answer any FIVE full questions.*

1. Give a brief explanation for the different categories of registers present in 8086/8088. Illustrate through an example any special functions (if any) performed by any registers.   **(10+10=20 Marks)**

2. (a) Explain the different forms of intra segment (unconditional) jump instruction.   **(10 Marks)**

    (b) For each form of intrasegment jump, give an assembly language program fragment illustrating the usage.   **(10 Marks)**

3. (a) For the following instruction $(INX[bX])$ does the assembler have enough information to produce the correct code? If not what is to be done to provide the needed information.

        .data
        xyz dw 1234H
        .code
        ....
        mov bx, offset xyz
        inn [bx]
        ....   **(10 Marks)**

    (b) Give a table indicating the different ways (24 in all) of addressing memory in 8086/8088.   **(10 Marks)**

4. (a) Write an assembly language program to check for the presence of a key in a table of entries. If the key is found, place AA in a known memory location. Indicate absence of the key similarly by placing BB in the same location.   **(10 Marks)**

    (b) What is a stack? What are the uses of the stack in 8086/8088. Explain the stack related instructions of 8086/8088.   **(10 Marks)**

5. (a) What are pseudo-operation codes?. Why are they called so? Explain any three pseudo-operation codes.   **(2+12=14 Marks)**

    (b) Give an example of an assembly language program spread over two files, one containing the caller portion and the other file containing the called subroutine.   **(6 Marks)**

6. (a) Explain the CMPS (Compare string) instruction of 8086/8088 through an example program segment.

   (b) Rewrite the above example (Q 6a) eliminating the CMPS instruction. The functionality should be the same. **(20 Marks)**

7. (a) What is memory interfacing? A 1024 × 8 memory chip has a $\overline{rd}$, $\overline{wr}$, $\overline{cs}$, Vcc, gnd and address and data lines. Show the connections between 8088 μp and the 1k chip, to place the chip in the last 1K of the memory address space. Assume demultiplexed address and data lines. **(14 Marks)**

   (b) Describe the I/O instructions of 8086/ 8088. **(6 Marks)**

8. (a) Explain the H/W interrupt structure of 8088/8086. **(10 Marks)**

   (b) Explain how a keyboard matrix can be interfaced to a microprocessor for the purpose of identifying the keys pressed. **(10 Marks)**

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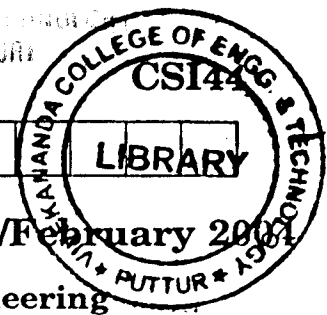# Fourth Semester B.E. Degree Examination, July/August 2003

Computer Science/Information Science and Engineering

Microprocessors

Time: 3 hrs.]

35

[Max.Marks : 100

Note: *1. Answer any FIVE full questions.*
2. All questions carry equal marks.

1. (a) Explain with a neat block diagram the architecture of 8086 / 8088 microprocessor.
   (12 Marks)

   (b) Explain the eight control lines which have different meanings in minimum and maximum modes of 8086 microprocessor.
   (8 Marks)

2. (a) Explain any four addressing modes of 8086 μp with an example for each.
   (12 Marks)

   (b) Write the instuction template for the following MOV instructions. **(8 Marks)**

   i) MOV SS, 1234H [BX + SI]

   ii) MOV BH, CL

   iii) MOV [SI], CX

   iv) MOV DS : 1234H[BP], DH

3. (a) Write an 8086 assembly language program to find factorial of a number using recursive procedure.
   (10 Marks)

   (b) Differentiate between macro and subroutine.
   (5 Marks)

   (c) Write a macro to display a message on the screen using int 21H.
   (5 Marks)

4. (a) Write an 8086 assembly level language program to read an unsigned 16-bit integer called X and to compute the expression $8x^3 + 4x + 1$ if the variable EQV is true otherwise compute $7x^2 + 8x + 2$. The 32 - bit result is placed in a double word memory location. Assume there is no overflow.
   (10 Marks)

   (b) Explain the different types of assembler directives used with 8086 processor.
   (10 Marks)

5. (a) Explain the architecture of 8255 and explain their operating modes control word format.
   (12 Marks)

   (b) Explain with a neat block diagram, 8254 TIMER. (Real time clock).
   (8 Marks)

6. (a) Design a memory system of size 64K x 8 bits using $8K \times 8bits$ DRAM chip and show the connections with a neat diagram.
   (8 Marks)

   (b) Explain with a neat diagram interfacing of a 7 segment display connected to a 8086 microprocessor through 8255 parallel (programmable) peripheral interface.
   (12 Marks)

7. (a) Explain interrupt vector table of 8086 and also write the contents of an interrupt vector. (10 Marks)

(b) Explain with a neat block diagram programmable interrupt controller (8259). (10 Marks)

8. (a) Explain the bus buffering and latching in 8086 with a neat diagram. (12 Marks)

(b) Explain the following pins of 8086.

i) INTR and $\overline{INTA}$

ii) HOLD and $\overline{HLDA}$

iii) RESET and READY

iv) $\overline{BHE}$ (8 Marks)

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34   Reg. No. ☐☐☐☐☐☐☐☐

)..rth Semester B.E. Degree Examination, January/February 2003
Computer Science/Information Science and Engineering
Microprocessors

Time: 3 hrs.]   Max.Marks: 100

Note: *1. Answer any FIVE full questions.*
      2. All questions carry equal marks.

1. (a) With programmer's model block diagram of 8080/8088, bring out its salient features.   (10 Marks)

   (b) Explain the various flags of 8086.   (10 Marks)

2. (a) Explain with examples, various addressing modes of 8086 microprocessors.
                                                                   (10 Marks)

   (b) Explain the different forms of intrasegment jump instructions.   (10 Marks)

3. (a) Write an assembly language program to arrange the given set of ten 2 digit numbers in descending order.   (10 Marks)

   (b) Write an assembly language program to find out odd and even numbers in an array. Store the result in separate arrays.   (10 Marks)

4. (a) What is a stack? Give the uses of the stack in 8086. Explain the stack related instructions of 8086/8088.   (10 Marks)

   (b) What is macro? How it is different from a subroutine? Explain.   (10 Marks)

5. (a) Identify the functions of the following:

   i)   ALE   ii) INTA   iii) IO/$\overline{M}$
   iv) READY   v) RESET   vi) NMI   (10 Marks)

   (b) Explain read/write cycle of 8086 with timing diagram.   (10 Marks)

6. (a) With a neat diagram and flow chart, describe how a 8 x 8 keyboard is interfaced to 8086 based microcontroller.   (10 Marks)

   (b) Give the classification of different types of memories. Discuss the advantages and disadvantages of each.   (10 Marks)

7. (a) With block diagram explain 8279.   (10 Marks)

   (b) With block diagram explain the working of 8254.   (10 Marks)

8.   Write short notes on
   (a) D.C. motor speed control using microprocessor.   (5 Marks)
   (b) Hardware interrupt of 8086/8088.   (5 Marks)
   (c) Address decoding.   (5 Marks)
   (d) Memory-mapped I/O.   (5 Marks)

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Fourth Semester B.E. Degree Examination, January/February 2004

Computer Science/Information Science and Engineering
Microprocessors

Time: 3 hrs.]   [Max.Marks : 100

Note: *1. Answer any FIVE full questions.*
2. All questions carry equal marks.
3. Write adequate comments for all your programs.

1. (a) With a functional block diagram, briefly explain the operation of the INTEL 8086 processor. **(10 Marks)**

   (b) At a particular instant, the data in certain registers of the 8086 are as below :

   $AX = 1234h$; $BX = 3456h$; $CX = \phi$
   $SI = 5678h$; $DI = ABCDh$; $BP = CDEFh$;
   $CS = 9079h$; $DS = 9053h$; $ES = 6789h; SS = 9079h.$

   If now, the instruction:

   MOVSB

   is executed by the processor, state clearly what happens in the memory. Also indicate what data are left in the above registers.

   Assume D flag is set   **(10 Marks)**

2. (a) What do you understand by pseudo operations or assembler directives?

   Give two examples of such directives and explain their operation. **(5 Marks)**

   (b) Distinguish between the instructions;

   JA   LABEL
   JG   LABEL   **(5 Marks)**

   (c) Write a simple program without using string instructions to copy 10 words of data from location starting at DS: 1000h to location starting DS : 2000h.
                                                         (10 Marks)

3. (a) Write an 8086 ALP for multiplying two thirty two bit unsigned numbers.
                                                         (10 Marks)

   (b) Indicate clearly and completely, what happens when ;

   i)   Instruction RET is executed from a near procedure

   ii)   Instruction RET is executed from a far procedure

   iii) Instruction RET6 is executed from a near procedure

   iv)   Instruction IRET is executed   **(10 Marks)**

   . (a) Explain the assembler directives EXTRN and PUBLIC. Illustrate their use.
                                                         (5 Marks)

(b) Distinguish between MACROs and PROCEDURES.   (5 Marks)

(c) A four digit Hex number can be converted to 5 digit BCD by successively dividing the hex data by 10 decimal. Write a macro to divide the number in register in AX by decimal 10, and to obtain the BCD digit as remainder.

Use this macro and write a public procedure to convert the 4-digit Hex number in AX to 5 digit BCD number in DX : AX.   (10 Marks)

5. (a) What are the functions of the following pins of 8086?

i) $\overline{RQ_0}\overline{GT_0}$ ii) $\overline{BHE}$ iii) $\overline{IO}/M$ iv) S_0, S_1, S_2 v) $\overline{TEST}$ (10 Marks)

(b) Give the timing diagram for the execution of the instruction ;

LOCK XCHG AX, SEMAPHORE

Where SEMAPHORE is the data in a memory, which does not require the use of READY line.

Show all the relevant signals.   (10 Marks)

6. (a) Interface $4K \times 16$ read write memory and $2k \times 16$ read only memory to 8086 microprocessor. Assume only $(2K \times 8)$ ROM and $(4K \times 8)$ Read write memories are available. Assume the starting address for read write memories is 04000H and read only memory 08000H. Show the design.   (10 Marks)

(b) Interface (4×4) matrix keyboard through 8255 PPI. Write an algorithm for the same.   (10 Marks)

7. (a) With a circuit diagram, explain how you would interface a seven segment display to an 8086 processor.   (10 Marks)

(b) With a block diagram, show how you would convert a speech signal to the digital form and store it in the memory using an 8086 processor and other relevant devices. At what frequency would you sample the speech? Why?
                                                                (10 Marks)

8. (a) Explain the interrupt vector tables of 8086 microprocessor.   (5 Marks)

(b) Explain 8259A interrupt controller operation, when used in AEOI (Automatic End of Interrupt mode). It is interfaced to 8086 microprocessor.   (5 Marks)

(c) What are the different modes of 8254 operation with a diagram. Explain mode -2 and mode -3 operations. Give the importance of gate signal.   (10 Marks)
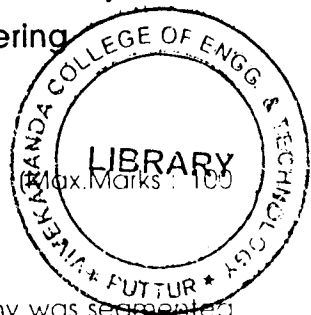
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CSI44

Reg. No. ☐☐☐☐☐☐☐☐☐☐☐

Fourth Semester B.E. Degree Examination, January/February 2006

Computer Science and Information Science Engineering
(Old Scheme)
Microprocessors

Time: 3 hrs.)

(Max.Marks : 100

Note: 1. *Answer any FIVE full questions.*
2. *All questions carry equal marks.*

1. Explain segmented memory addressing used by 8088/8086. Why was segmented memory addressing used? For a particular memory address give 4 segment:offset address pairs. **(10+4+6=20 Marks)**

2. (a) The number of bytes an instruction can occupy in 8088/8086 is in the range of 1 byte to 6 bytes. Give an example (instruction) each to cover the full range. **(12 Marks)**

   (b) Through a simple example indicate how a conditional jump instruction (together with an unconditional jump) can be used to jump to a target outside the range of −128 to +127 byte offsets. **(8 Marks)**

3. (a) Explain the different forms of inter-segment jump(unconditional) of 8086/8088. **(10 Marks)**

   (b) Illustrate through an example each form of intersegment jump (unconditional). **(10 Marks)**

4. (a) Explain the following addressing mode :
   i)   Register indirect
   ii)   Register relative
   iii) Based, indexed plus displacement. **(10 Marks)**

   (b) Write an assembly language program to sum up the elements of an array. **(10 Marks)**

5. (a) Explain the DAA instruction of 8088/8086 through examples, covering all possible cases of inputs. **(14 Marks)**

   (b) Explain the flagword of 8086/8088. **(6 Marks)**

6. (a) Explain the MOVS (move string) instruction with an example. **(10 Marks)**

   (b) Convert the above example (of Q.6a) in to a program segment that does not use MOVS but achieves the same functionality. **(10 Marks)**

7. (a) Differentiate between I/O mapped I/O (Isolated I/O) and memory mapped I/O **(10 Marks)**

   (b) Explain the different I/O instructions provided by 8088/8086. **(10 Marks)**

8. (a) What are interrupts? Distinguish between software interrupts and H/W interrupts **(10 Marks)**

   (b) Explain the interrupt vector table of 8088/8086. **(10 Marks)**

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NEW SCHEME

Fifth Semester B.E. Degree Examination, Dec. 06 / Jan. 07
Computer Science Engineering
Advanced Microprocessor

Time: 3 hrs.]   [Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. Design a 16-bit wide memory interface that contains SRAM memory at locations 200000 to 21FFFF for the 80386SX processor. Give the memory map. **(12 Marks)**
   b. Give the memory system organization of 80386 and Pentium processors. **(08 Marks)**

2 a. Give the salient features of 8279 programmable keyboard and display interface. **(08 Marks)**
   b. What are the different operating modes of 8254 programmable interval timer? Explain. Write a program to generate a square wave of 1 kHz frequency on OUT1 pin of 8254. Assume clock frequency is 1 MHz and address for control register = 0BH, counter 1 = 09H and counter 2 = 0AH. **(12 Marks)**

3 a. Give the block diagram of 8259 interrupt controller and explain its working principle. **(10 Marks)**
   b. What is meant by bus arbitration? Describe different techniques, with diagram. **(10 Marks)**

4 a. Describe register set and data formats of 8087 math processor. **(10 Marks)**
   b. Convert 1259.125 decimal number to its equivalent short real, long real formats. **(06 Marks)**
   c. List categories of instructions of 8087 and give one example each. **(04 Marks)**

5 a. List the salient features of PCI bus and give PCI configuration space details. **(10 Marks)**
   b. Given the USB connector details and explain the process of generating USB data from raw digital serial data. **(10 Marks)**

6 a. With neat diagram explain address translation in protected mode of 80386 with paging enabled. **(12 Marks)**
   b. List the various registers of 80386 processor and their use. **(08 Marks)**

7 a. Compare Pentium, Pentium-Pro, Pentium-II, Pentium-III and Pentium-IV registers with respect to data BUS addressing capability, cache memory, speed, processor structure and other features. **(12 Marks)**
   b. Discuss the important features of RISC processors. Name any 3 RISC processors. **(08 Marks)**

8 Write short notes on :
   a. ISA BUS
   b. MMX technology
   c. Character generation logic
   d. TSS. **(20 Marks)**

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Fourth Semester B.E. Degree Examination, June/July 08
Microprocessors

Time: 3 hrs.

Max. Marks:100

Note : Answer any FIVE full questions.

1 a. With a neat diagram, explain the architecture of 8086 microprocessor along with functions of each block and registers.   **(10 Marks)**
   b. Explain the addressing modes used in 8086 with an example for each.   **(10 Marks)**

2 a. State and explain instruction formats of 8086. Also generate the opcode for following instructions :
       i) MOV AX, BX   ii) MOV 46h [BP], DX   iii) MOV CS : [BX], AL   iv) IN Al, DX   **(08 Marks)**
   b. Explain the following assembler directives with example :
       i) PROC and ENDP   ii) PUBLIC and EXTRN   iii) MACRO and ENDM
       iv) ASSUME   v) SEGMENT, ENDS   **(08 Marks)**
   c. Explain the following instructions :
       i) div   ii) XLat   iii) AAA   iv) XCHG   **(04 Marks)**

3 a. Write an ALP to find factorial of a number using recursion.   **(06 Marks)**
   b. Explain the types of program execution transfer instruction (Branch instructions) with examples.   **(08 Marks)**
   c. Write a delay procedure for producing a delay of 1 sec for 8086 microprocessor working at 10 MHz.   **(06 Marks)**

4 a. Explain string related instructions with examples.   **(08 Marks)**
   b. Bring out the differences between macro and procedure.   **(06 Marks)**
   c. Explain the sequence of operations that takes place when a procedure is called and returned from procedure back to calling program.   **(06 Marks)**

5 a. Write an ALP to find NCR using recursive procedure. Assume N and R are non-negative numbers.   **(10 Marks)**
   b. Write an ALP to read a string from keyboard convert to upper case and display on monitor.   **(10 Marks)**

6 a. Explain minimum mode PINS of 8086 and minimum mode configuration of 8086 with a neat diagram.   **(08 Marks)**
   b. Bring out the differences between 8086 and 8088 microprocessors.   **(06 Marks)**
   c. Interface 8 K ROM using 2732 chip and 4K RAM using 6116 chip to 8086 assuming starting address for ROM as 40000h and for RAM it is 44000h.   **(06 Marks)**

7 a. Explain the types of interrupts along with action taken by 8086 when an interrupt occurs. Also explain interrupt vector table.   **(10 Marks)**
   b. Explain with block diagram, the working of 8259 and also explain ICW's and OCW's.   **(10 Marks)**

8 a. Explain the control word format of 8255 and modes of operation of 8255. Also write the control word to select PC_2, PC_4 and set pc_2, reset pc_4.   **(10 Marks)**
   b. Explain how do you interface a stepper motor to 8086 to rotate the motor in clockwise direction by 360^0 and then anticlockwise direction by 180^0 using 8255 with a neat diagram.   **(10 Marks)**

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Fourth Semester B.E. Degree Examination, Dec 08 / Jan 09
Microprocessors

Time: 3 hrs.

Max. Marks:100

Note : *Answer FIVE full questions, selecting atleast TWO questions from each Part A and Part B.*

PART - A

1. a. Explain with neat diagram, the internal architecture of 8086 microprocessor. Clearly state functions of following in brief. i) Queue   ii) BIU   iii) AX   iv) IP.   **(10 Marks)**
   b. Explain any five addressing modes with example of each. Also mention the effective offset address of memory location.   **(10 Marks)**

2. a. Write and explain instruction template for MOV instruction. Find out machine code for the instruction MOV [SI], al.   **(10 Marks)**
   Find and explain errors, if there are any in the following instructions.
   i) MOV BH, DX   ii) OUT 65H, al   iii) MUL BL, CL   iv) POP F
   v) SHR AX, 02.   **(10 Marks)**

3. a. Write an ALP to add 5, 16 bit unsigned binary numbers and save the sum and average in memory locations.   **(06 Marks)**
   b. Write an ALP to calculate delay of 100 milliseconds for 8086 MP working at 10 MHz clock.   **(06 Marks)**
   c. Compare macro and procedure with example of each.   **(08 Marks)**

4. a. Explain conditional and unconditional jump instructions in 8086 MP with example of each. Clearly differentiate between short, near and far jump.   **(10 Marks)**
   b. Write an ALP to find factorial of single digit number using recursive procedure. Describe stack operations when CALL and RET instructions are executed.   **(10 Marks)**

PART - B

5. a. Explain following with example of each. i) DAA   ii) Xlat   iii) SCASB   iv) DD   v) PUBLIC.   **(10 Marks)**
   b. Write an ALP to count number of 1 in given 16 bit unsigned binary number. Save the count in memory locations.   **(05 Marks)**
   c. Write procedure to convert two digits packed BCD number to two ASCII characters and store them in memory location.   **(05 Marks)**

6. a. With neat diagram, explain minimum mode configuration of 8086 MP.   **(08 Marks)**
   b. Explain with neat timing diagram, the bus activities during a memory read machine cycle.   **(06 Marks)**
   c. With neat diagram, explain memory organization in 8086 microprocessor.   **(06 Marks)**

7. a. Explain the action taken by 8086 MP when an interrupt occurs. Explain interrupt vector table.   **(10 Marks)**
   b. Show the sequence of ICW and OCW to initialize IC 8259 with base address of FF10H as follows : Edge triggered, Only one 8259 IC, 8086 MP, Interrupt type 40H corresponds to IR₀ input, Normal EOI, Nonbufferred mode, not fully specially nested mode, IR₁ and IR₃ inputs unmasked.   **(10 Marks)**

8. a. Explain different methods of parallel data transfer with waveforms.   **(10 Marks)**
   b. With internal diagram, explain function of various blocks of 8255 PPI. Find out CW for 8255 PPI with A, B port as input and C port as output in mode O.   **(10 Marks)**

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Fourth Semester B.E. Degree Examination, June-July 2009
Microprocessors

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. With a neat diagram explain the architecture of 8086 microprocessor along with function of each block and register. **(10 Marks)**

   b. How many address lines does an 8086 have?
      i)   How many memory addresses does this number of address lines allow the 8086 to access directly?
      ii) At any given time, the 8086 works with 4 segments in this address space. How many bytes are contained in each segment?
      iii) Describe the difference between the instructions
           MOV AX, 2347H   and   MOV AX, [2347H] **(05 Marks)**

   c. Write 8086 assembly instruction which will perform the following operations:
      i)   Multiply AL times BL.
      ii) Load the number F3H into AL register.
      iii) Copy BP register contents to SP register.
      iv) Divide the AL register contents by 2 by using a shift instruction.
      v)   Multiply the AL register contents by 4 using shift instruction. **(05 Marks)**

2 a. Write and explain instruction template for MOV instruction. Also generate opcode for following instructions: The opcode for MOV is [1|0|0|0|1|0| |]
      i)   MOV CL, [BX]
      ii) MOV CS, [BX], DL
      iii) MOV 43H [S1], DH
      iv) MOV CX, [437A]H **(10 Marks)**

   b. What is an assembler directive? Explain the following assembler directive with example:
      i) PUBLIC   ii) PROC   iii) MACRO   iv) BB. **(05 Marks)**

   c. Find and explain error if there are array in the following instructions:
      i) MOV AL, CX   ii) MVL BL, CX   iii) MOV Arr1[S1], Arr2[D1]
      iv) IN, 82H, AL   v) XCHG, AL, BL **(05 Marks)**

3 a. Explain the 8086 conditional flags with each flag bits. **(06 Marks)**

   b. Write an ALP to separate odd & even number in an array. **(07 Marks)**

   c. Write an ALP to calculate delay of 100 ms for 8086 microprocessor working at 10 MHz clock. Assume and mention the states for each instruction used. **(07 Marks)**

4 a. Differentiate between macros and procedures. **(05 Marks)**

   b. Explain REP MOVSB instruction with example. **(05 Marks)**

   c. Explain the sequence of operation that takes place when a procedure is called and returned from procedure base to calling program with block diagram. **(10 Marks)**

PART – B

5 a. Explain the following instructions with an example:
   i)   DAA
   ii) AAM
   iii) LOOP
   iv) SUB
   v)   XLAT   (10 Marks)

   b. Write an ALP tó find subtracting is present or not in the main string. (10 Marks)

6 a. Differentiate between memory mapped I/O and direct I/O.   (05 Marks)

   b. Write the timing diagram for a memory read machine cycle.   (05 Marks)

   c. With a neat diagram, explain the pin configuration of 8086.   (10 Marks)

7 a. Briefly explain the structure of 8086 interrupt response and interrupt vector table with a neat diagram.   (10 Marks)

   b. Explain with block diagram, the working of 8259 and also explain LCW's format. (10 Marks)

8 a. Explain the different methods of parallel data transfer with figure in a programmable peripheral interface.   (10 Marks)

   b. Explain with the internal block diagram of 8255, the different operational modes and the control word formats.   (10 Marks)

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Fourth Semester B.E. Degree Examination, Dec.09/Jan.10
Microprocessors

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

Part – A

1 a. Sketch neat block diagram of internal architecture of 8086 microprocessor. Explain functions of following in brief: i) BIU   ii) Queue   iii) AX
                         iv) IP   v) CX   vi) CS   **(12 Marks)**

     b. Calculate physical address of memory to access OP code and stack.
IP = C846H, CS = 8480 H, SS = C800H, SP = FFFFH.   **(04 Marks)**

     c. Identify memory addressing mode in the following instructions and calculate effective offset address: i) MOV AX, 1000 H   ii) MOV CX, [1000H]
                   iii) MOV al, [SI+05]   iv) ADD AX, BX   **(04 Marks)**

2 a. State and explain instruction format for MOV instruction to transfer data between register and memory. Also generate opcode for following instructions assuming the opcode for mov as 1 0 0 0 1 0 0 1.
     i) MOV AL, BL   ii) MOV AX, [BX]
     iii) MOV AL, [SI+05]   iv) MOV CX, [1000H]   **(10 Marks)**

     b. Explain following assembler directives with examples of each:
     i) PROC and ENDP   ii) MACRO and ENDM   iii) DW, DD
     iv) EVEN   v) PUBLIC and EXTRN.   **(10 Marks)**

3 a. Explain instructions with example of each:
     i) DAA   ii) XLAT   iii) DIV   iv) AAA   v) CMP
                                                      (10 Marks)

     b. Differentiate between short, near and far jump instructions with two examples of each.   **(10 Marks)**

4 a. Write an ALP which reads the user password through keyboard and check with stored correct password. Display the result as 'Valid' or 'Not valid' password on monitor by using DOS function 07 interrupt 21 H.   **(08 Marks)**

     b. Write an ALP to calculate delay of 100 milliseconds by using 8086 MP working at 10 MHz clock frequency. Assume the states for the instructions used.   **(06 Marks)**

     c. Write an ALP to compute the value of function $f(x) = 4x^2 + 8x - 20$ where x is 8 bit unsigned binary number.   **(06 Marks)**

Part – B

5 a. Write an ALP to compute factorial of single digit positive number using recursive procedure. For N = 4 show the stack operations.   **(08 Marks)**

     b. Write procedure to unpack BCD digits from packed two digit BCD number and store the result in memory locations.   **(06 Marks)**

     c. List the instructions to process the flags in flag register.   **(06 Marks)**

6 a. Explain with block diagram minimum mode configuration of 8086 MP. How de-multiplexing of address bus is obtained?   **(10 Marks)**

   b. Draw and explain the timing diagram for opcode fetch memory read cycle with one wait state for 8086 MP.   **(10 Marks)**

7 a. Explain the action taken by 8086 MP when an interrupt occurs. Describe Interrupt Vector Table (IVT).   **(08 Marks)**

   b. Explain with neat diagram how NMI pin of 8086 MP is used to read ASCII characters through keyboard? Also write instructions to initialize IVT for NMI interrupt.   **(06 Marks)**

   c. Interface IC 8259 to 8086 MP with a base address of FF10H. Write initialization sequence for IC 8259 with edge triggered input, only one 8259 IC, 8086 MP, interrupt type 40 H corresponds to IR_O input, normal EOI, non buffered mode, not SFNM, IR and IR_3 are unmasked.   **(06 Marks)**

8 a. With neat timing diagram explain the different types of parallel data transfer from 8255.   **(06 Marks)**

   b. Describe internal block diagram of IC 8255 PPI.   **(08 Marks)**

   c. Explain control word format for IC 8255 PPI. Write initialization sequence for IC 8255 PPI in mode 'O' with A port, B port as output and C port as input with address of A port FF00H.   **(06 Marks)**

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Fourth Semester B.E. Degree Examination, May/June 2010
Microprocessors

Time: 3 hrs.   Max. Marks:100

Note: *1.Answer any FIVE full questions, selecting*
at least TWO questions from each part
2.ALP should be well commented.

PART – A

1   a.   Explain the internal architecture of 8086, with a neat diagram.   **(10 Marks)**
    b.   What is meant by pipelining? How is it implemented in 8086? Explain the advantages of pipelining.   **(05 Marks)**
    c.   Illustrate the concept of segmented memory, with a neat diagram. Explain four advantages of segmentation.   **(05 Marks)**

2   a.   List any six assembly language program development tools. Explain any four ALP development tools.   **(10 Marks)**
    b.   Construct the machine code for   MOV CL, [BX] instruction.   **(10 Marks)**

3   a.   Briefly explain various addressing modes of 8086, with suitable instructions.   **(08 Marks)**
    b.   Explain with an example, how multiple If-Then-Else statement can be implemented, using ALP.   **(08 Marks)**
    c.   Write an ALP to clear all control flags of 8086.   **(04 Marks)**

4   a.   Differentiate between a macro and subroutine.   **(04 Marks)**
    b.   Explain with an example, how parameters can be passed to a subroutine, using stack. **(08 Marks)**
    c.   Write an ALP to validate a password. Assume the correct password as SECRET.   **(08 Marks)**

PART – B

5   a.   Explain with examples, the following assembler directives:
         i) EXTRN   ii) EVEN   iii) TYPE   iv) ASSUME.   **(10 Marks)**
    b.   Compute the factorial of a given 8-bit number using recursion.   **(10 Marks)**

6   a.   Illustrate with a neat diagram, the working of 8086 in the minimum mode. Also give the timing diagram of I/O read operation.   **(10 Marks)**
    b.   Interface four 8 KB RAMS starting with an address of 60000H. Draw the memory map and address decoder worksheet. Use 74LS138 decoder for external address decoding. **(10 Marks)**

7   a.   List and describe the steps a 8086 will take when it responds to an interrupt.   **(06 Marks)**
    b.   Briefly explain the operation of 8259, with a neat block diagram.   **(08 Marks)**
    c.   Describe the response a 8086 will make , if it receives an NMI interrupt signal during a division operation which produces a divide by zero interrupt. Illustrate this concept with a stack diagram.   **(06 Marks)**

8   a.   Draw the control word format of 8255. Explain it.   **(08 Marks)**
    b.   Explain different methods of data transfer schemes, with suitable examples.   **(06 Marks)**
    c.   Write an ALP to display 0 to 9 on a 7-segment LED display device.   **(06 Marks)**

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