CSI44

Reg. No. | | | | | | | | | | |

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) $IO/\bar{M}$ 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 × 8. to have the starting address located at $00000H$. The memory chips have $\overline{rd}$, $\overline{wr}$, $\overline{cs}$, addres and data buses. Use suitable decoder for addressing decoding **(20 Marks)**

Contd.... 2

CSI44

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
$\bar{rd}, \bar{wr}, \bar{cs}$	3
3 sets of (CLK, gate, out pins)	3 × 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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CSI44

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 dω 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 contaning the caller portion and the other file containing the called subroutine. **(6 Marks)**

Contd.... 2

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 interupt 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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CSI44

Reg. No. | | | | | | | | | | |

Fourth 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 8086/8088, 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 8×8 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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CSI44

USN | | | | | | | | | | |

Fourth Semester B.E. Degree Examination, July/August 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) 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 × 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)**

Contd.... 2

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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CSI44

USN

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

Computer Science/Information Science and Engineering

Microprocessors

[Max.Marks : 100

Time: 3 hrs.]

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. **(10 Marks)**

Assume D flag is set

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)**

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

Contd.... 2

(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) $\overline{R}Q_0\overline{G}T_0$ 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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EC45

NEW SCHEME

USN

Fourth Semester B.E. Degree Examination, July/August 2004

Common to EC/EE/TE/ML/BM/IT/EE

Microprocessors

[Max.Marks : 100

Time: 3 hrs.]

Note: ***1. Answer any FIVE full questions.***
2. 8085 instruction set will be provided on request.

1. (a) Explain the functions and timing associated with i) STA and ii) RST instructions. **(3 Marks)**

(b) The instruction set of microprocessor is divided into several headings. Explain the importance and significance. How are the codes designed for ADD B and JNZ addr ? **(9 Marks)**

(c) What is cycle stealing ? Explain with an example and the corresponding ALP. **(8 Marks)**

2. (a) Explain the various addressing modes used in 8085 with an example for each. **(5 Marks)**

(b) Write a recursive subroutine named FACT to find factorial of the number in 8085 μP. **(7 Marks)**

(c) Discuss the advantages if any, of having more number of general purpose registers in a microprocessor. Substantiate with a suitable example. **(8 Marks)**

3. (a) Using a suitable delay routine, write an ALP for a real time clock with i) A TIC at each second, ii) Alaram Facility and iii) 12 hour and 24 hour facility provision. **(10 Marks)**

(b) Using JMP, can you call a subroutine ? Explain with an example and a corresponding ALP. **(6 Marks)**

(c) Why you think that W and Z registers are provided in 8085 ? Explain their use with an example. **(4 Marks)**

4. (a) Write an ALP, so that HEX byte is displayed on the DATAFIELD and the corresponding decimal Value (00_{10} to 255_{10}) is displayed on the address field. How would you modify the above program to convert the range displayed (0000-0255) to (0000-1020)? **(10 Marks)**

(b) Write a subroutine DAC, which does the same function that of DAA ? Can you write the DAC, with/without testing for the AC flag ? Explain. **(5 Marks)**

(c) One of the easy ways of interfacing a slow device to processor is to reduce the clock frequency, if so, what are the limits and why ? **(5 Marks)**

5. (a) Design a microcomputer to obtain the following :

4K EPROM, 512 bytes static RAM, four, 8 bit and two, 6-bit ports, using

i) Standard I/O and linear decoding

ii) Full decoding using 3X8 decoder

iii) Memory mapped I/O and full decoding. **(16 Marks)**

(b) What is vector interrupt ? Explain its working with an example and an ALP. **(4 Marks)**

6. (a) How is the device priority determined in hardware polling ? Explain. **(4 Marks)**

Contd.... 2

(b) Two devices are connected to 8085 interrupts as shown in fig 6.b. If device 2 is presently being serviced by 8085 and the Device 1 interrupt occurs, explain what the user needs to do in the service routine of Device 2 in order that Device I will be serviced before Device 2.

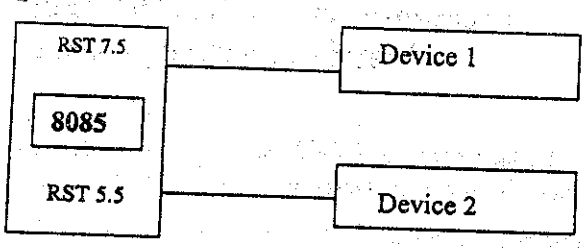

Fig. Q 6 b)

(8 Marks)

(c) It is required to use the μp for the measurement of frequency and period of a given square wave. Write the setup and an ALP for the purpose. Discuss, limitations, if any. **(8 Marks)**

7. (a) In the context of using 8251 for communication purpose, write a subroutine HEX BYTE that reads two ASCII characters by calling the subroutine RDASKY, converts them into binary valued by calling ASCBIN and combines the binary values in a byte. **(6 Marks)**

(b) Using 8279 KB/Display controller, program it to display characters on the display. Display the status as below.

In a temperature process, temperature is to be maintained between limits T_0 and T_0^*. If the measured temperature is between T_0^* and T_0 buzzer, if OFF, lamp is OFF and fan is OFF. If $T > T_0$ buzzer is ON, lamp is OFF, fan is ON. If $T \leq T_0^*$, buzzer is ON, lamp is ON and fan is OFF. OFF may be represented by a – and ON by a 0.

Initialize 8279 and write an ALP for performing the above function.

(c) Why should a DMA request have higher priority than other interrupts ? On what basis priorities are assigned to the devices on the DMA channel. **(10 Marks)**

8. (a) In an 8085 based system, how would an I/O device distinguish whether the address sent out is for an input or output operations (assume I/O mapped I/O). Note that an input and output device can be assigned indentical addresses. **(4 Marks)**

(b) The memory address space of 8085 is limited to 64K owing to address bus width. It is desired to expand this addressing space to 128K. Suggest a suitable interface so that this expansion is possible. After the expansion, how would an instruction, address any byte from the expanded address space. **(4 Marks)**

(c) Write an ALP for performing the following (fig 8.c). Start a process tomorrow at X pm. Process to be finished at Y pm on the same or another day. Press two keys : X_1Y : START TIME and DURATION TIME. You may use a timer 8253 or a delay program for the purpose. **(8 Marks)**

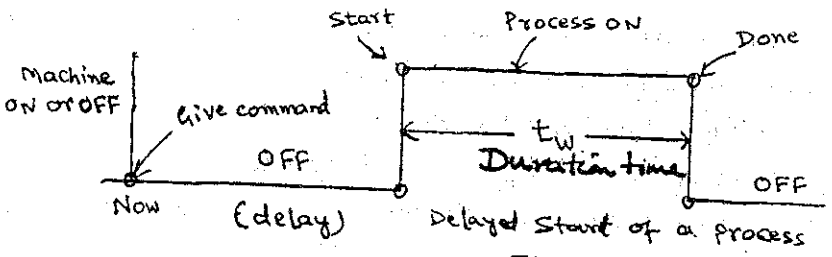

Fig. 8.c

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USN | | | | | | | | | | |

Fourth Semester B.E. Degree Examination, July/August 2004

Computer Science/Information Science and Engineering

Microprocessors

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

Note: ***Answer any FIVE full questions.***

1. (a) Write at least 5 instructions that use the AL register. Example :- MOV instruction.
Similarly at least 3 instructions that use CL register.
Two instructions that use DX register. **(10 Marks)**

(b) Describe the function of 8086 with respect to **(10 Marks)**

i) Queue ii) Flag register
iii) Segment registers iv) Arithmetic logic unit
v) BIU and EU.

2. (a) What conditions will cause the BIU to suspend fetching instructions ? **(5 Marks)**

(b) Assume the add instruction of 8086 has the opcode format 000000DW

Write instruction operation for the following instructions

i) $ADD\ AX,\ [DI+200]$

ii) $ADD\ DX,\ [BP+SI+3604]$

iii) $ADD\ [3200],\ CL$

iv) $ADD\ SI,\ BP$

v) $ADD\ [BX+DI],\ DL$ **(10 Marks)**

(c) Explain the importance of string instructions. Give one good example with simple program to support the importance. **(5 Marks)**

3. (a) Write an assembly program to find odd and even numbers of an array of n numbers. The value of 'n' is available in memory location VALVE. Store all odd numbers from memory ODD and even numbers from memory EVEN. Write comments to explain your program. **(12 Marks)**

(b) Give a name to the above program and explain the procedure to assemble it and execute it. Explain how to view the result. **(8 Marks)**

4. (a) What is a macro ? Explain the advantage of using conditional macro. Write a program to show the operation of conditional macro. Explain the program. **(10 Marks)**

(b) List the conditional jump instructions that are used for signed numbers. Explain why they are used for signed numbers only with the flag condition. **(10 Marks)**

Contd.... 2

5. (a) What are the conditions indicated by QS_0 and QS_1 pins of 8086 microprocessor? Explain the necessity of these two signals. **(5 Marks)**

(b) Explain the operation of 8086 microprocessor when it is interrupted by INTR interrupt. **(8 Marks)**

(c) What is an interrupt ? Explain different types of interrupts. **(7 Marks)**

6. (a) Why is 8259 interrupt controller required ? Discuss the features of 8259 PIC. **(10 Marks)**

(b) Interface $8K \times 8$ EPROM memories (2764) to 8086 microprocessor to obtain $32K \times 8$. Show the 0 memory starting address, ending address and the number of address lines required for the same. Show how A_0 and $\overline{BHE}$ signals are used to select the odd and even address. **(10 Marks)**

7. (a) Interface 8 switches to 8086 microprocessor using 74LS244 to read the condition of the switches with Open High and Closed Low. Assume I/O space 30 H to 3FH are free for interface. Assume 30 H as the principal address and the rest addresses are flod back address. Show the address lines, data lines, control lines and the decoding circuit for the interface. **(10 Marks)**

(b) Write a neat internal block diagram of 8255, give the control word format for the operating modes. **(10 Marks)**

8. (a) What are the different operation modes of 8254? Explain mode 2 and mode 3. **(10 Marks)**

(b) How does PWM control the speed and direction ? Explain with a neat diagram. **(10 Marks)**

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(Pages 2)

CSI—

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

MICROPROCESSORS

Time : Three Hours

Maximum : 100 Ma

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

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

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

2. (a) Explain with examples, the instructions to perform PUSH and POP operations. (10 mar

   (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 ma

   (c) Explain DAA instruction with examples. (5 ma

3. (a) Explain MOVS instruction with examples. (5 ma

   (b) Explain with examples the intra segment call instructio (5 ma

   (c) Write an 8086 assembly language program to evaluate the expres $W = X * (X + Y - Z)$, where W, X, Y and Z are memory locations — (10 ma

4. (a) What are the advantages of macro over subroutines ? Generate a table of squ using macros, where the result is less than 255. (10 ma

   (b) Write an assembly language to sort in ascending order using insertion algorithm, given a set of 16-bit unsigned numbers in memory. (10 ma

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

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

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

   (b) Classify the different types of memories. Discuss the advantages and di of each. (10 ma

Turn

CSI44

USN | | | | | | | | | | |

Fourth Semester B.E. Degree Examination, January/February 2005

Computer Science/Information Science and Engineering

Microprocessors

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

Note: *1. Answer any FIVE full questions.*
2. Use of handbook/chart tables etc not permitted.

1. (a) With a neat diagram, explain the functional pin diagram of 8086 in minimum mode. **(12 Marks)**

   (b) Explain the flags available in 8086. After the addition of 2345H and 6789H, what will be the value of the various flags ? **(4 Marks)**

   (c) Bring out the differences between 8086 and 8088 microprocessors. **(4 Marks)**

2. (a) With examples, explain any 6 addressing modes of 8086. **(10 Marks)**

   (b) Explain the fields used in the template for the instruction 'Move data between a register and register / memory'. Derive the code for the instruction $MOVDH, [S1 + 85H]$ **(10 Marks)**

3. (a) Explain the execution of the following instructions (may be some data is not needed). **(10 Marks)**

   i) DAA if AL = 8CH, AH = 05H, Cy = 0, AC = 0

   ii) IMUL BL if BL = FEH, AL = 03, AH = 05, CL = 04

   iii) DIV CH if AL = 09, CH = 04, CL = 02, AH = 00

   iv) XLAT if AL = 03, BL = 00, BH = 12 H, DS = 1000H, (11203H) = 33H, CL = 02

   v) MOVSB is SI = 1000H, DI = 2000H, DS = 1234H, ES = 3456H, (13340H) = 45H

   (b) Describe the action taken by 8086 when INTR pin is activated. **(5 Marks)**

   (c) Describe the various types of software interrupt instructions. **(5 Marks)**

4. (a) Explain with a neat diagram the 16 bit interface of two $8K \times 8$ SRAM chips. The address range for the two chips are to be 04000H, 04002H, 04004H, ... 07FFEH and 04001H, 04003H, 04005H, ... 07FFFH. respectively. **(12 Marks)**

   (b) With a neat sketch explain the memory read machine cycle with one wait state. Give an example for an instruction that uses both memory read and memory write machine cycles. **(8 Marks)**

5. (a) Explain with examples conditional jump instructions of 8086 that perform a jump based on the value of more than one flag. **(10 Marks)**

   (b) Explain the followng instructions with examples. **(10 Marks)**

   i) LOOPE Back

   ii) JCXZ Next

Contd.... 2

EC45

NEW SCHEME

USN

Fourth Semester B.E. Degree Examination, July/August 2005

BM/EC/EE/TE/ML/IT

Microprocessors

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

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

1. (a) Give a general block diagram of a microprocessor based system. Explain briefly the various blocks of the system. Give some examples of the types of devices used for each block. **(10 Marks)**

   (b) Give a list of the registers of 8085 that are accessible to the programmer. Explain what each of these registers are generally used for. **(10 Marks)**

2. (a) Give two examples for each of the following types of instructions and indicate what each of these instructions do :

   i) Instructions with implied addressing

   ii) ALU type of instructions

   iii) Instructions addressing memory indirectly through any register pair.

   iv) Conditional branch instructions. **(10 Marks)**

   v) Interrupt related instructions.

   (b) Consider the fetch and execute operations of the instruction "MOV M, A". Assume ready line is not activated, and answer the following :

   i) How many T-cycles and how many machine cycles would be required ?

   ii) What control signals are produced during each of the machine cycles ?

   iii) In which T-cycles do the A/D pins carry the data ?

   iv) Which register produces the address during each of the machine cycles.

   v) What would be the status signals $S0$ & $S1$ during the first machine cycle ? **(10 Marks)**

3. (a) Explain the functions of following pins of 8085 :

   i) $IO/\overline{M}$

   ii) S_0 and S_1

   iii) HOLD/HLDA **(8 Marks)**

   iv) READY

   (b) Write an 8085 ALP to add two 16-bit data stored in consecutive memory locations and arrange to have the result stored in the following three memory locations, (using one byte location to store the carry, so that the result becomes a 24-bit value). **(12 Marks)**

Contd.... 2

4. (a) Write an 8085 ALP subroutine to produce a delay of 1 second. Consider the 8085 clocked at 5 MHz. **(10 Marks)**

(b) Write an 8085 ALP subroutine to convert a 2-digit BCD number to a 2-digit hex number. **(10 Marks)**

5. (a) Design a circuit to interface a 4kB RAM using 6116 from address 8000H, and 4KB ROM using 2716 from address OOOOH. Assume demultiplexed address and data buses are available. Complete address decoding is required. **(10 Marks)**

(b) Explain :

i) Memory mapped I/O

ii) I/O mapped or standard I/O

iii) Serial I/O

in connection with an 8085 processor system. Indicate the advantage of each of the above I/O types. **(10 Marks)**

6. (a) Consider an 8085 processor is enabled to accept interrupt through any of its interrupt accepting pins. How would you disable it selectively so as not to accept interrupt through the pin RST 6.5 ?

If now the processor is simultaneously interrupted through pins RST 5.5 and INTR, explain step-by-step how 8085 deals with the situation and services both the interrupts. **(10 Marks)**

(b) Interface an A/D converter to 8085 and write a program to convert the analog input to digital. **(10 Marks)**

7. (a) With circuit diagrams, explain how you would accomplish the following in an 8085 processor system.

i) Interface a switch giving a single bit input to the processor (Use serial I/O pins)

ii) Switch a 230 V power circuit on-or-off using a single bit from an 8-bit port interfaced to the processor. **(5+5 Marks)**

(b) Show how you would interface a keyboard to an 8085 processor using 8255. Write an ALP to generate a key code for the key pressed. **(10 Marks)**

8. (a) What is DMA operation ? Explain the features and operation of DMA controller 8257 with a block schematic. **(10 Marks)**

(b) With a block diagram, explain any ONE of the following chips :

i) 8255 PPI

ii) 8253 Timer **(10 Marks)**

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EC45

NEW SCHEME

Reg. No. | | | | | | | | | | |

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

BM/EC/EE/TE/ML/IT

Microprocessors

Time: 3 hrs.) (Max.Marks : 100

Note: ***Answer any FIVE full questions.***

1. (a) Which are the microprocessor initiated operations? With a block diagram, explain the 8085 bus organization. **(8 Marks)**

   (b) Explain the operation of the following pins of 8085
   i) READY ii) S 1 and S 0 iii) IO/$\overline{M}$ ii) ALE **(8 Marks)**

   (c) Assume that the GO 2000 EXEC command is given in a 8085 microprocessor trainer kit. List the activities that take place in the sequence of their happenings. **(4 Marks)**

2. (a) What do you mean by addressing modes of data? Explain the four important such modes of 8085 with an example for each one of them. **(9 Marks)**

   (b) Following program has been written to pick the largest out of six 8 bit numbers stored in the memory starting with the address 1020H containing 20H, 1AH, 23H, 40H, 48H and 22H in the same order. Indicate the contents of the registers HL, C, A, M and status of CY flag at the end of the execution of the program. **(9 Marks)**

```
        LXI   H, 1020 H
        MVI   C,05H
        MOV   A,M
        INX   H
LOOP :  CMP   M
        JNC   NEXT
        MOV   A,M
NEXT :  DCR   C
        JNC   LOOP
        HLT
```

   (c) If a 8085 microprocessor system is to have one 2K ROM and one 2K RAM chip, what should be the starting addresses of these chips? **(2 Marks)**

3. (a) Write an ALP to find the average of six, 8 bit numbers stored from memory location XX20H. Store the average valve after the last number in the memory. **(10 Marks)**

   (b) i) What are the uses of subroutines?

   ii) Initially if SP=2000H, BC=1234H, HL=5678H, sketch the stack memory contents after the execution of the following program segment indicating the SP value

```
PUSH H
POP  D
PUSH B
```

(6 Marks)

   (c) Calculate the time required to execute the following program segment with a 8085 CPU connected with a crystal of 2 MHz. **(4 Marks)**

```
        MVI D, 04H
BACK:   DCR D
        JNZ BACK
```

Contd.... 2

4. (a) Sketch and briefly explain the timing diagram of the instruction ADD M. **(8 Marks)**

(b) Write an ALP to store the status of the flags S,Z,AC, P and CY as 00H(FFH) if they are reset (set) in five memory locations starting with the address 1020H. **(10 Marks)**

(c) i) Which 8085 arithmetic instruction does not affect zero flag?

ii) Whet is the value of SP upon reset of 8085? **(2 Marks)**

5. (a) Interface 2K×8 bit ROM starting with address 0000H and $4K \times 8$ bit RAM starting with address 1000H using 2716 and 6116 chips respectively, to 8085. Indicate the address map and use absolute decoding with the help of 74138. Show clearly all the control signals. **(10 Marks)**

(b) Interface 8 dip switches and 8 relays to 8085 in memory mapped I/O with addresses FFF8H and FFF9H, respectively. Use 74LS244 and 74LS373 chips. Write a program to switch ON/OFF relays depending on the status of the switches whether they are ON/OFF. **(8 Marks)**

(c) If a subroutine is entered using a CALL instruction and returned to main program from subroutine by a jump instruction instead of a RET instruction, what is the disadvantage? **(2 Marks)**

6. (a) Explain the SIM and RIM instructions of 8085. **(6 Marks)**

(b) Explain the sequence of operations that takes place when the interrupt on INIR pin of 8085 is active. **(4 Marks)**

(c) Design a 1-minute timer using a 60 Hz power line as an interrupting source for 8085. The two output ports PORT 1 and PORT 2, respectively should display minutes and seconds. **(10 Marks)**

7. (a) Explain the internal schematic of 8255 chip and is operating modes briefly. **(10 Marks)**

(b) Interface a 8255 to 8085 and write an ALP to generate a rectangular waveform with 1 msec ON time and 2 msecs OFF time. **(10 Marks)**

8. Write shorts note on :

(a) Demultiplexing scheme of addr/data bus of 8085.

(b) 8253 timer

(c) 8279 keyboard/display controller

(d) D/A conversion with 8085. **(5×4=20 Marks)**

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CS144

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 flagward 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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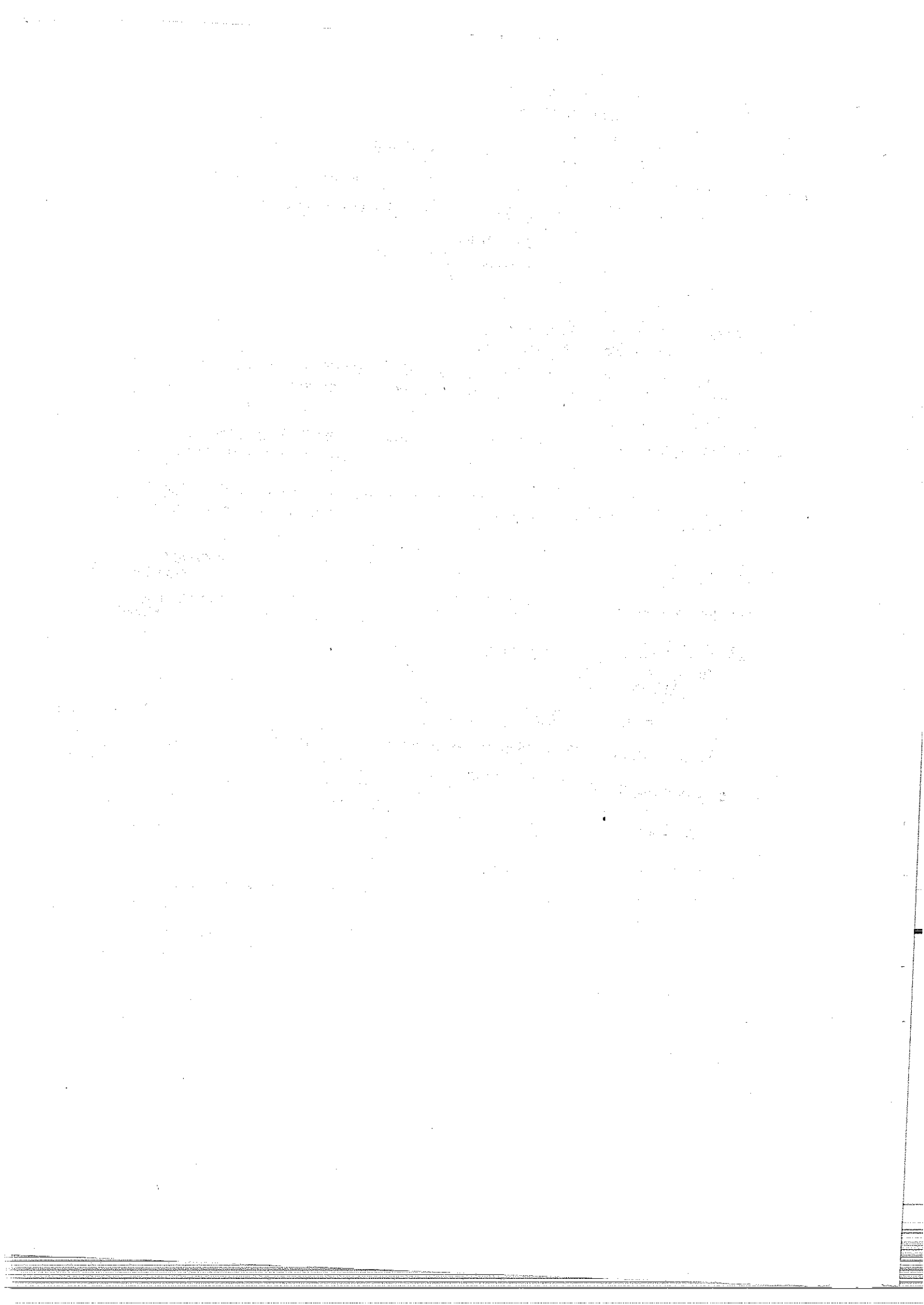

EC45

USN | | | | | | | | | | |

NEW SCHEME

Fourth Semester B.E. Degree Examination, July 2006
Electronics & Communication Engineering
Microprocessors

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

Note: 1. ***Answer any FIVE full questions.***
2. Comments should be provided for all programs.

1 a. Explain with a neat block diagram the working of 8085 microprocessor with special emphasis on registers and their uses. **(10 Marks)**

b. What are flags? Give the structure and explain their significance with respect to 8085. **(05 Marks)**

c. What are the hardware and software interrupts available in 8085? Which has the highest priority? **(05 Marks)**

2 a. What happens when the following instructions are executed?
i) DAA ii) XTHL iii) JM addr iv) CC addr v) SBB C **(05 Marks)**

b. Write an assembly language program to find the square of an inputted number. The inputs are 0.....9 and the ouputs should be 0.....81. **(08 Marks)**

c. Give the timing diagram for ADD B. Explain the different signals **(07 Marks).**

3 a. Generate a sawtooth by writing a suitable assembly language program. Modify the same to generate a triangular wave. What determines the altitude and base of the triangle? **(10 Marks)**

b. Find the greatest common denominator for 3 numbers. [Hint : Use subroutines] **(05 Marks)**

c. Use logical instructions to decide whether the given number, stored in memory is a Palindrome are not. **(05 Marks)**

4 a. Multiply and divide two 16 bit BCD numbers (4 decimal digits) which are stored in memory. The results should be stored back in the same locations. **(10 Marks)**

b. Perform BCD to seven segment conversion using assembly language program. **(05 Marks)**

c. What are the machine control instructions? **(05 Marks)**

5 a. Interface one 2K ROM and two 4K RAMS to 8085 through suitable hardware. What is the memory map of such a system? **(10 Marks)**

b. Differentiate between memory mapped I/O and I/O mapped I/O. **(05 Marks)**

c. What is the maximum number of external interrupts that can be connected to 8085 under any scheme? Explain. **(05 Marks)**

6 a. Give the step by step actions taking place in 8085 when its execution is interrupted. **(10 Marks)**

b. How do you trouble shoot a program using the facilities available in a 8085 kit? **(05 Marks)**

Contd....2

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OLD SCHEME

Fourth Semester B.E. Degree Examination, Dec. 06 / Jan. 07
CSE / ISE
Microprocessors

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

Note : ***Answer any FIVE full questions.***

1 a. With a neat diagram explain the architecture of Intel 8086 microprocessor. **(10 Marks)**
b. Distinguish between logical address and physical address with an example, explain how physical address generation is done in8086 microprocessor. **(06 Marks)**
c. Distinguish between a microprocessor and a microcomputer. **(04 Marks)**

2 a. Explain the following instructions with an examples and also specify the status of the flag register.
i) Loop ii) TEST iii) CBW iv) CLD v) INTO **(10 Marks)**
b. Writer an assembly language program to sort an array of N bytes in ascending order. The number of bytes N is stored in the first location of the array. **(10 Marks)**

3 a. Explain with examples, the different string primitives available in 8086 instruction set. **(10 Marks)**
b. Write a far procedure to search for an alphabet in a string of characters. Indicate the status of the alphabet in the memory location called 'flag'. Write the main program to check the contents of the memory location 'flag' and display an appropriate message. All the locations are declared in the main program. **(10 Marks)**

4 a. Explain the use of EXTERN and PUBLIC declarations in modular programming. Illustrate with an example. Also explain how you link two different programs to get a single executable file (eg. a .EXE file) **(10 Marks)**
b. Explain the different flags available in the flag register of 8086. Give the sum and flag settings when 62A0 is added to i) 1234 ii) CFA0 iii) 4321 iv) 9D60 **(10 Marks)**

5 a. Describe the operation of 8086 in maximum mode. Give and explain a typical maximum mode configuration. **(10 Marks)**
b. What are the functions of the following pins in a 8086 microprocessor?
i) $\overline{BHE}$ ii) $\overline{LOCK}$ iii) DT/$\overline{R}$ iv) READY v) INTA **(10 Marks)**

6 a. What are the following memory types? Explain.
i) SRAM ii) DRAM iii) EEPROM **(12 Marks)**
b. Why are memory address decoders important? **(03 Marks)**
c. Explain how odd parity is stored in a memory system and how it is checked? **(05 Marks)**

7 a. What is an interrupt vector? How many different interrupt vectors are found in the interrupt vector table and which interrupt vectors are reserved in the 8086 CPU? Explain. **(10 Marks)**
b. Discuss the features of 8255 PPI device. Give its application with a parallel printer interface. **(10 Marks)**

8 Write short notes on :
a. Comparison of 8086 and 8088 processors
b. Memory mapped I/O and isolated I/O
c. Debugging techniques
d. 8284 clock generator. **(20 Marks)**

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NEW SCHEME

Fourth Semester B.E. Degree Examination, Dec. 06 / Jan. 07
EC / EE / TE / IT / ML
Microprocessors

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

Note : ***Answer any FIVE full questions.***

1 a. What is the difference between a microprocessor, a microcomputer and a microcontroller? **(06 Marks)**

b. What are memory, addressable memory, primary memory and memory map of a MP based system? How many address lines are required to address a memory of 16 KB? **(06 Marks)**

c. Draw the functional diagram used to explain the architecture of 8085 A microprocessor and mention the function of each part. **(08 Marks)**

2 a. Explain the function of the signal at each of the following pins of 8085 A : ALE ; READY ; and IO / M. **(06 Marks)**

b. List all the registers available in 8085 A microprocessor and state whether they are accessible or not in each case. What is the function of each of the inaccessible registers? **(06 Marks)**

c. Indicating the flag conditions, explain the operational difference between the following pairs of instructions :
   i) CALL 6644H and JMP 6644H;
   ii) SUB C and CMP C;
   iii) XRA A and MVI A 00H; and
   iv) SPHL and XTHL. **(08 Marks)**

3 a. Define instruction and instruction set. What are the fields of an instruction and what are the different ways of specifying these fields? **(06 Marks)**

b. What are loops and nested loops? Register C with an initial value of 55H is used as counter in a loop of a program. How many times will register C is decremented and how many times will the 'jump' takes place before exciting the loop? What is to be changed to make the program to loop 100 times? **(06 Marks)**

c. Define T-state, machine cycle and the instruction cycle. Draw the timing diagram for the instruction MVI A, 66H which is stored in memory starting from the address 5678H, indicating all the relevant contents given that the opcode for MVI A is 3E. **(08 Marks)**

4 a. What is stack memory? How is it initialized? Give the contents of SP register, register pairs and stack memory when each of the following instructions is executed. LXI SP, 8888H; LXI B, 11AA; LXI D, 22BB; LXI H, 33CC; PUSH B; PUSH D; PUSH H; .....; POP H; POP B; POP D; ..... **(06 Marks)**

b. Write an ALP to add N 8-bit numbers stored in the memory starting from the address 6650H. Store the result at 6690H and 6681H. **(06 Marks)**

c. Write an ALP to control a traffic signal, which turns on green light for 40 seconds, yellow light for 5 seconds and red light for 30 seconds. The bits 0, 1 and 2 of PORT 1 are controlling the peripherals that run the green, yellow and red signal light circuits respectively. Use an available 1 second DE register pair delay subroutine "DELAY". **(08 Marks)**

Contd.... 2

5 a. What is subroutine? Why and how is it documented? Differentiate among nested subroutine; recursive subroutine; and multiple end subroutines. **(06 Marks)**

b. Write an ALP to clear all flags; load the data byte FFH into A Reg; increment the accumulator; mask all the flags except the carry flag; and display the carry flag at PORT 0. Again load the data byte FFH into A Reg; add the data byte 01H to it; mask all the flags except the carry flag; and display the carry flag at PORT 1. Explain the difference in the answer. **(06 Marks)**

c. Write an ALP to convert a given BCD number to an equivalent binary number. **(08 Marks)**

6 a. Differentiate between :
   i) Synchronous and Asynchronous data transfer;
   ii) Serial and Parallel data transfer;
   iii) Memory mapped I/O and I/O mapped I/O schemes. **(06 Marks)**

b. Explain the use of RIM and SIM instructions. How to mask RST7.5 and RST6.5 and to enable RST5.5 using SIM instruction? **(06 Marks)**

c. What are interrupts? How are they classified? Draw the diagram describing the interrupt structure of 8085A microprocessor. How is the address of the service routine resolved for nonvectored interrupts? **(08 Marks)**

7 a. Is it possible to interface an input device and output device with the same device address? If so, what control signals will differentiate these operations? Explain the reason for decoding the higher order address lines in interfacing an I/O device. **(06 Marks)**

b. Explain the terms :
   i) Linear-select decoding;
   ii) Absolute decoding; and
   iii) Bus contention. **(06 Marks)**

c. Draw an interfacing scheme for 2K ROM, 2KRAM, one input device and one output device using memory mapped I/O scheme. **(08 Marks)**

8 a. Explain the port selection logic and the control word format for different mode selection in 8255A PPI. **(06 Marks)**

b. What are the six modes of operation of 8253A programmable interval timer? Explain the control word format and mode definitions. **(06 Marks)**

c. What are the main functions of 8251A USART? Explain the mode instruction format and command instruction format for synchronous operation. **(08 Marks)**

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NEW SCHEME

Fourth Semester B.E. Degree Examination, July 2007
EC / EE / TE / BM / ML / IT
Microprocessor

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

Note :1. ***Answer any FIVE full questions.***
2. Programs should have comments.

1 a. Give the block diagram of 8085 and explain the function of each block. **(10 Marks)**
b. What do you mean by interfacing? **(05 Marks)**
c. What are the functions of the following: i) Buffer ii) Latch. **(05 Marks)**

2 a. What happens when the following instructions are executed:
i) XCHG ii) LDAX B iii) PUSH PSW iv) LHLD 1600H **(08 Marks)**
b. What are machine control instructions? Give an example for each. **(06 Marks)**
c. Write an assembly language program to generate a secret code. Input is an 8 bit data from memory. In the coded output the MSB is given by $A_7 = A_5(+)A_3(+)A_0$ where (+) indicates EX – OR operation. **(06 Marks)**

3 a. Generate a time delay of 5 minutes, using a program, given that the clock frequency of the processor as 3.07 MHz. **(05 Marks)**
b. What are nested loops? How do you generate a square wave using nested loops? **(05 Marks)**
c. Explain the stack operation with explanatory diagrams. **(05 Marks)**
d. What are flags? Describe each flag of 8085 and its significance. **(05 Marks)**

4 a. Write an assembly language program to add and subtract two 8 digit Binary numbers stored starting from memory locations X and X+5. The result of addition and subtraction should start from memory locations Y and Y+5 respectively. Make provisions for inter digit carry. **(10 Marks)**
b. Explain the addressing modes used in INTEL's 8085 processor with an example. **(10 Marks)**

5 a. Interface two 4K EPROMS and two 4K RAMs to 8085 by designing a suitable interface circuit. Also connect two I/O devices to the system. Give the memory map of the whole set up. **(10 Marks)**
b. Differentiate between I/O mapped I/O and memory mapped I/O. **(05 Marks)**
c. Write an assembly language program to convert the Binary numbers stored in memory to ASCII code number by writing a suitable program. **(05 Marks)**

6 a. Give a detailed account of the Interrupt mechanism available in 8085 processor. **(10 Marks)**
b. What is a non-maskable interrupt? What is its significance and where is it used? **(05 Marks)**
c. What happens when 8085 is reset? Also, explain what happens when RST is executed. **(05 Marks)**

7 a. Using 8255 programmable peripheral interface, connect an ADC to 8085 processor to read the temperature of a furnace at 15 minute intervals. **(10 Marks)**
b. How do you program 8253 programmable interval timer to act as hardware strobe? **(05 Marks)**
c. What is DMA? Briefly explain the two different DMA operations. **(05 Marks)**

8 a. Interface 8X3 keyboard with 4 seven segment displays to 8085 based microcomputer. Assume suitably any missing data. Give control word to read keyboard and display data. **(10 Marks)**
b. Give the control words and status words of programmable interrupt controller 8259 and explain their significance. **(10 Marks)**

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CSI44

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OLD SCHEME

Fourth Semester B.E. Degree Examination, July 2007
CSE / ISE
Microprocessors

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

Note : ***Answer any FIVE full questions.***

1 a. Explain different data related addressing modes of 8086 with examples. **(12 Marks)**
b. Discuss various program memory addressing modes. **(08 Marks)**

2 a. Explain the following instructions :
i) LODS
ii) STOS
iii) MOVS
iv) CMOV **(10 Marks)**
b. Explain the various program control instructions available with 8086. **(10 Marks)**

3 a. Explain how a procedure can be defined. Give the advantages and disadvantages of procedures. **(10 Marks)**
b. Explain how the interrupts are processed in real mode by 8086. **(10 Marks)**

4 a. What are Macros? Illustrate the use of a macro within a program. **(10 Marks)**
b. Explain the various conditional assembly statements. **(10 Marks)**

5 a. With a neat pin out diagram of 8086, explain the function of each pin. **(08 Marks)**
b. Explain the need of demultiplexing of buses in 8086. Also explain how it is done. **(12 Marks)**

6 a. Explain the various memory devices that are used with 8086. **(10 Marks)**
b. Develop a 16 bit memory decoder that places memory at 060000H to 06FFFFH. **(10 Marks)**

7 a. Explain the different modes in which 8255 operates. **(10 Marks)**
b. Explain the functional details of 8254. **(10 Marks)**

8 a. Explain the programming details of 8259. **(10 Marks)**
b. Explain how ADC's and DAC's can be interfaced with 8086. **(10 Marks)**

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USN | | | | | | | | | | |

CSI44

Fourth Semester B.E. Degree Examination, Dec. 07 / Jan. 08
Microprocessors

Time: 3 hrs. Max. Marks:100

Note : ***Answer any FIVE full questions.***

1 a. With a neat diagram, explain the functional pin diagram of 8086 in minimum mode. **(12 Marks)**

b. Explain the flags available in 8086. After the addition of 2345H and 6789H, what will be the value of the various flags? **(04 Marks)**

c. Bring out the differences between 8086 and 8088 microprocessors. **(04 Marks)**

2 a. With examples, explain any 6 addressing modes of 8086. **(10 Marks)**

b. Explain the fields used in the template for the instruction 'Move data between a register and register / memory'. Derive the code for the instruction M O V D H, [S1 + 85H]. **(10 Marks)**

3 a. Write an assembly program to find odd and even numbers of an array of n numbers. The value of 'n' is available in memory location VALVE. Store all odd numbers from memory ODD and even numbers from memory EVEN. Write comments to explain your program. **(12 Marks)**

b. Give a name to the above program and explain the procedure to assemble it and execute it. Explain how to view the result. **(08 Marks)**

4 a. What is a macro? Explain the advantage of using conditional macro. Write a program to show the operation of conditional macro. Explain the program. **(10 Marks)**

b. List the conditional jump instructions that are used for signed numbers. Explain why they are used for signed numbers only with the flag condition. **(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 × 16 read write memory and 2k × 16 read only memory to 8086 microprocessor. Assume only (2K × 8) ROM and (4K × 8) Read write memories 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. Describe the functional pin diagram of 8254 PIC. Write the control word for configuring Timer 2 in Mode 3, BCD counting, and to load a 16 bit value. Explain model operation of a timer in 8254. **(10 Marks)**

b. What is the need for 8259 PIC? Describe the functional pin diagram of 8259. Explain ICW1, ICW2, and ICW3 commands. Indicate the steps needed so that 8086 may receive interrupt type number 43H when IR3 input of 8259 is activated. **(10 Marks)**

8 a. Explain the interrupt vector tables of 8086 microprocessor. **(05 Marks)**

b. Explain 8259A interrupt controller operation, when used in AEOI (Automatic End of Interrupt mode). It is interfaced to 8086 microprocessor. **(05 Marks)**

c. How does PWM control the speed and direction? Explain with a neat diagram. **(10 Marks)**

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EC45

Fourth Semester B.E. Degree Examination, Dec. 07 / Jan. 08
Microprocessors

Time: 3 hrs. Max. Marks:100

Note : ***Answer any FIVE full questions.***

1 a. With the help of neat block diagram, explain the architecture of Intel 8085 Microprocessor. **(14 Marks)**

b. Describe the function of following pins of 8085:
i) HOLD ii) READY iii) ALE. **(06 Marks)**

2 a. Explain the various addressing modes of 8085 giving examples for each. **(10 Marks)**

b. Explain the operational difference between the following pairs of instructions:
i) SPHL and XTHL ii) CALL addr and JMP addr iii) LHLD and SHLD addr
iv) DAD rp and DAA v) INR A and ADI 01H. **(10 Marks)**

3 a. Write an equivalent single instructions for the following program operations:

i) MVI L, 00H
MVI H 90H
MOV A, M

ii) LDA addr
MOV L, A
LDA addr+1
MOV H, A **(04 Marks)**

b. Write an assembly language program to convert a 2 digit BCD number stored at memory location X, to binary number to be stored in memory X+1. **(08 Marks)**

c. Write an 8085 ALP subroutine to produce a delay of 0.5 sec. Consider the operating frequency of 8085 as 2.5 MHz. **(08 Marks)**

4 a. Write a program to add two 2 digit BCD numbers stored at memory locations X and X+1. Store the result in successive memory locations. **(08 Marks)**

b. Draw and explain timing diagram of the instruction LHLD addr. **(12 Marks)**

5 a. Explain and compare memory mapped I/O scheme and I/O mapped I/O scheme. **(06 Marks)**

b. Interface the following devices to 8085:
16 kbyte of EPROM using two 8 kbyte EPROMS and 4 kbyte of RAM using two 2 kbyte RAMs. Show memory map for the scheme and all control signals in the interface. Use contiguous address for ROM and RAM. **(10 Marks)**

c. If (SP) = 8000 H, (HL) = 2030 H, sketch the stack memory with SP, initially and after the instruction PUSH H. **(04 Marks)**

6 a. Describe the interrupt system of 8085. Explain the use of instruction SIM and RIM in implementing serial communication. **(10 Marks)**

b. What is DMA operation? Explain the features and operation of DMA controller 8257 with a block diagram. **(10 Marks)**

7 a. With the help of block diagram, briefly discuss the features of 8255, along with modes of operation. **(10 Marks)**

b. An array of 8 LED's are interfaced to 8085 through port A of 8255. Write an ALP to switch ON and OFF all LED's with a delay. **(06 Marks)**

c. Write a program to output logic 1 on PC3 of 8255 using BSR mode. **(04 Marks)**

8 a. Explain the features any three programming modes of 8253 PIT. **(10 Marks)**

b. With neat block diagram explain features and operation of 8259 interrupt controller. **(10 Marks)**

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USN | | | | | | | | | | |

06CS45

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)**

b. 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 IR_0 input, Normal EOI, Nonbufferred mode, not fully specially nested mode, IR_1 and IR_3 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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06CS45

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 to 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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06CS45

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_0 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 FFOOH. **(06 Marks)**

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