

III B.Tech. II Semester Regular Examinations, April/May -2005
MICROPROCESSORS AND INTERFACING
(Common to Electrical & Electronic Engineering, Electronics &
Communication Engineering, Electronics & Instrumentation Engineering,
Bio-Medical Engineering, Electronics & Control Engineering and Electronics
& Telematics)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Compare 8 bit processors and 16 bit processors from the architectural view.
(b) Explain Overflow condition with 8 bit signed data. Generate Overflow flag using other flags of 8086?
2. (a) Discuss various branch instruction of 8086 microprocessor, that are useful for relocation?
(b) Using a do-while construct, develop a sequence of 8086 instructions that reads a character string from the keyboard and after pressing the enter key the character string is to be displayed again.
3. Describe the function of the following pins and their use in 8086 based system.
 - (a) NMI
 - (b) \overline{LOCK}
 - (c) \overline{TEST}
 - (d) RESET
4. Explain how to interface a stepper motor with 4-step input sequence to 8086 based system with the help of hard ware design? Write the instruction sequence to move the stepper motor 10 steps in clockwise and 12 steps in anti-clockwise direction.
5. (a) What are the MODEM control lines? Explain the function of each line? Discuss how MODEM is controlled using these lines with necessary sequence of instructions?
(b) Discuss the Command instruction and Status register format of 8251?
6. (a) How many initialization command words are required for a single 8259 in an 8086 based system? Explain their format?
(b) What is type 2 interrupt? Explain the condition for initiating type 2 interrupt? What is the priority of this interrupt in 8086?
7. In an SDK-86 kit 64KB SRAM and 32KB EPROM is provided on system and provision for expansion of another 64KB SRAM is given. The on system SRAM address map is from 00000H to 0FFFFH and that of EPROM is from F8000H to

FFFFFH. The expansion slot address map is from 80000H to 8FFFFH. The size of SRAM chip is 32KB. EPROM chip size is 16KB. Give the complete memory interface and also the address map for individual chips?

8. (a) Discuss the following signal descriptions?

- i. $\overline{INT_0}/\overline{INT_1}$
- ii. TXD
- iii. T_0 AND T_1
- iv. \overline{RD}

(b) Draw and discuss the formats and bit definitions of the following SFRs in 8051 microcontroller?

- i. TMOD
- ii. PSW

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1. It is necessary to check whether the word stored in location 4000H:A000H is positive number or not? Show all possible ways of testing the above condition and store 00H if the condition is satisfied in location 3000:2002. Otherwise store 0FFH.
2. (a) Distinguish between inter-segment and intra-segment CALL instructions and explain with examples how they are executed?
(b) Give a neat flow chart and the corresponding 8086 assembly language program for performing bubble sort in an array of N elements of 4-digit Hex numbers.
3. The I/O circuitry in an 8086 based system consists of five I/O devices with one status signal for each device. Design the required hardware providing two address locations to each device, one for status and other for data. In the range 0F00H to 0F0FH. Write an instruction sequence to test the status of each device and store it.
4. Explain why 8255 ports are divided into two groups? Discuss how these groups are controlled in different modes of operation? Explain different control signals and their associated pins for bi-directional I/O mode of operation?
5. (a) What are the MODEM control lines? Explain the function of each line? Discuss how MODEM is controlled using these lines with necessary sequence of instructions?
(b) Discuss the Command instruction and Status register format of 8251?
6. (a) Write an instruction sequence that will cause the priority of an 8259, whose even address is 0800H, to be IR_5 , IR_6 , IR_7 , IR_0 , IR_1 , IR_2 , IR_3 , IR_4 . Solve this problem when the current priority is IR_1 and for the second time assuming the current priority to be IR_7 ?
(b) Explain with examples how interrupt type 1 and type 3 provide debugging feature?
7. In a home PC with 8088 processor, SRAM is provided from 00000H and EPROM ends with the address of FFFFFH. The capacity of SRAM is 256KB and that of EPROM is 32KB. All the chips are of size 32KB. Give the address map for individual chip and design the complete memory interface?

8. Draw and discuss the formats and bit definitions of the following SFR's in 8051 microcontroller?

- (a) PSW
- (b) IE
- (c) SCON
- (d) TMOD

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1. (a) What is the length of the instruction queue in 8086? Discuss the use of the queue? Explain the reason for limiting the length of queue?
(b) What is the minimum number of segment registers that are necessary to provide segmentation? How do access common data for different programs using segmentation?
2. (a) What are the different ways of passing parameters to and from procedures? Explain the methods with examples in assembly language?
(b) Give a neat flow chart and the corresponding 8086 assembly language program for performing bubble sort in an array of N elements of 4-digit Hex numbers.
3. What is function of ready pin in 8086. Draw the circuit diagram for wait state generation between 0 and 7 wait states and draw the corresponding timing diagram.
4. Interface a 12-bit DAC to 8255 with an address map of 0C00H to 0C03H. The DAC provides output in the range of +5V to 5V. Write the instruction sequence.
(a) For generating a square wave with a peak to peak voltage of 4V and the frequency will be selected from memory location 'F'.
(b) For generating a triangular wave with a maximum voltage of +3V and a minimum of 2V.
5. (a) Draw the block diagram of 8251 and explain each block?
(b) Draw the flowchart showing how synchronous serial data can be sent from a port line using software routine?
6. (a) What are the five types of interrupts supported by 8086?
(b) Write about interrupt vectors? How many bytes of memory does an interrupt vector requires?
(c) Address 000E0H in the interrupt vector table contains 4132H and address 000E2H contains 0040H.
 - i. To what interrupt type do these locations correspond?
 - ii. What is the starting address for the interrupt service routine?

7. (a) With a sketch explain 74LS138 decoder and its use?
(b) Generate chip select signals with the help of 74LS138 to six memory chips of size 16KB, with the address map from 00000H to 17FFFH?
8. (a) Discuss the interrupt structure of 8051? Mention the priority? Explain how least priority is made as highest priority?
(b) Explain the support given in 8051 instruction set to handle bit addressable RAM?

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1. (a) What is the length of the instruction queue in 8086? Discuss the use of the queue? Explain the reason for limiting the length of queue?
(b) What is the minimum number of segment registers that are necessary to provide segmentation? How do access common data for different programs using segmentation?
2. (a) Develop an 8086 assembly language program that will determine if a given sub-string is present or not in a main string of characters. Place the result as 'P' if present else place 'N' in memory location 'result'.
(b) What is a procedure? How is a procedure identified as near or far?
3. Describe the function of the following pins and their use in 8086 based system.
 - (a) NMI
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 - (d) RESET
4. Interface a 12-bit DAC to 8255 with an address map of 0C00H to 0C03H. The DAC provides output in the range of +5V to 5V. Write the instruction sequence.
 - (a) For generating a square wave with a peak to peak voltage of 4V and the frequency will be selected from memory location 'F'.
 - (b) For generating a triangular wave with a maximum voltage of +3V and a minimum of 2V.
5. (a) Discuss the serial data transmission standards and their specifications?
(b) A terminal is transmitting asynchronous serial data at 2400 bd. What is the bit time? Assuming 7 data bits, a parity bit and 1 stop bit how long does it take to transmit one character?
6. (a) What are the five types of interrupts supported by 8086?
(b) Write about interrupt vectors? How many bytes of memory does an interrupt vector requires?

- (c) Address 000E0H in the interrupt vector table contains 4132H and address 000E2H contains 0040H.
 - i. To what interrupt type do these locations correspond?
 - ii. What is the starting address for the interrupt service routine?
- 7. (a) Discuss the organization of FLASH memory? Explain the FLASH memory command definitions?
- (b) With the help of basic cell explain SRAM and DRAM? Discuss the advantages and disadvantages of the above memories?
- 8. Draw and discuss the formats and bit definitions of the following SFR's in 8051 microcontroller?
 - (a) IP
 - (b) TMOD
 - (c) TCON
 - (d) SCON
