

**III B.Tech. I Semester Supplementary Examinations, May -2005**  
**MICROPROCESSORS AND INTERFACING**  
**(Electronics & Computer Engineering)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) Draw the block diagram of 8086 and explain each block?  
(b) Discuss the addressing modes provided by 8086 and explain with examples?
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. 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 0FOFH. Write an instruction sequence to test the status of each device and store it.
4. Interface a stepper motor with 8-step input sequence to 8086 based system and write the instruction sequence to move the stepper motor 20 steps in clockwise and 12 steps in anti-clockwise direction.
5. (a) Explain demand transfer mode and block transfer mode of 8237?  
(b) Show how 8237's are cascaded to provide more number of DRQ's and explain the operation?  
(c) Explain how memory to memory transfer is performed with 8237?
6. (a) Discuss the sequence of operations performed in the interrupt acknowledge cycle?  
(b) What is the difference between RET and IRET? Discuss the result, if RET instruction is placed at the end of the interrupt service routine?  
(c) What is the vector address of type 50H interrupt?
7. (a) Design the required logic to generate read, write control signals for memory and I/O in a target system using 8086 microprocessor? Generate bank select signals for even and odd address memory banks?  
(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) PCON
- (b) PSW
- (c) IP
- (d) TMOD

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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. Develop an 8086 assembly language program that reads a key from the keyboard and converts it to uppercase before displaying it. The program needs to terminate on typing the 'Ctrl + C' key combination.
3. Distinguish between a memory read and write machine cycle? Draw the timing diagrams in minimum and maximum modes of operation?
4. (a) Draw the block diagram of 8255 and explain each block? Discuss different modes of operation?  
(b) With neat layout, explain how a microprocessor can be used for data acquisition system using A/D converters and D/A converters?
5. (a) Draw the block diagram of 8251 and explain each block?  
(b) Discuss the serial data transmission standards and their specifications?
6. (a) Write an instruction sequence that will cause the priority of an 8259, whose even address is 0200H, 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  $IR_3$  and for the second time assuming the current priority to be  $IR_6$ ?  
(b) Under what conditions type 0 interrupt is initiated? List out the instructions that may cause type 0 interrupt?
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. (a) How does 8051 differentiate between the external and internal program memory?  
(b) Explain with waveforms different modes of counter/timer in 8051?

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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. It is necessary to define a block of data in 8086 assemble language program. The length of the block is 80,000 Bytes. Give the initialization of data segment for the above data? It is necessary to exchange second element and 70000<sup>th</sup> element in the above. Give the sequence of instructions to perform the above operation?
3. (a) What are the control signals useful for inter processor communication using 8086? What instruction set support is provided in 8086?  
(b) Design an I/O port decoder that generate the following low-bank I/O strobes: 0010H, 0020H, 0030H, 0040H.
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 is the difference between 20mA current loop and RS232C standard?  
(b) Explain the necessity of RS232 to TTL interface and draw the circuit?  
(c) Draw the circuit of TTL to RS232 and explain the necessity of this interface.
6. (a) Draw the block diagram of 8259 and explain each block?  
(b) Explain how IRET instruction is executed?
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) How does 8051 differentiate between the external and internal program memory?  
(b) Explain with waveforms different modes of counter/timer in 8051?

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(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 assembly language program to find the average of 'n' elements of an array of 4-digit hex numbers? Round off the average to digits position? The value of 'n' is available in location 'length'.  
(b) Develop an assembly language program to convert 4-digit hex to BCD?
3. Distinguish between a memory read and write machine cycle? Draw the timing diagrams in minimum and maximum modes of operation?
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) Draw the block diagram of 8251 and explain each block?  
(b) Discuss the serial data transmission standards and their specifications?
6. With detailed hardware and the associated algorithm, explain how a real time clock will be implemented in an 8086 based system.
7. (a) With a neat sketch explain the internal organization of SRAM chip? List out the input and output pins? Discuss their function in a system?  
(b) Draw the basic cell structure of EPROM and explain the principle of operation?  
(c) Distinguish between EPROM and  $E^2$ PROM? Mention their application areas?
8. Interface two 8255's to 8051 with starting address of 0F000H? Show the hardware design? Write the instruction sequence to initialize all ports of first 8255 as output ports in mode 0 and in the second 8255 port A as input in mode 1 and other ports as input in mode 0.

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