

IV B.Tech II Semester Regular Examinations, Apr/May 2008
MICROPROCESSORS
(Mechanical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Discuss the functions of ALU of 8085.
(b) What are the various status flags provided in 8085? Discuss their role. [8+8]
2. Develop the machine code for following instructions.

- (a) MOV AX, 000
- (b) MOV CX, [2000]
- (c) MOV [2000], BX
- (d) MOV AX, BX
- (e) ADD AX, BX
- (f) CMP CX, BX.

Take 6bit codes for MOV: 100010 ADD: 000000 CMP: 001110 [2+3+3+2+3+3]

3. (a) Explain the following Instructions.
 - i. LDS
 - ii. PUSHF
 - iii. XLAT
 - iv. XCHG.(b) Write a program to convert a BCD Number to a Binary Number. [8+8]
4. (a) Write the sequence of statements that declare the word named 'NWORD' and FAR label 'EXTMOD' as being external and the variable 'IWORD' and the label 'LOCMOD' as being local and accessible by other source modules?
(b) Give the sequence of instructions that pushes the offsets of word variables X, Y and Z in data segment onto stack? [8+8]
5. Assume that the symbol table starting at location TABLE consists of 100 entries. Each entry has 80 bytes with the first 8 bytes representing the name field and the remaining 72 bytes representing the information field. Write an instruction sequence to search this table for a given name of 8 characters stored in NAME. If the name is found, copy the associated information into INFO, otherwise, fill INFO with null characters? [16]

6. 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. [16]
7. Explain how eight seven-segment display devices and hex keyboard can be interfaced to microprocessor using common scan lines? Draw the flow chart of the keyboard scan routine and display routine for this system? [16]
8. Write a program to initialize 8251 in synchronous mode with even parity, single SYNC character, 7 bit data character. Then receive 0FFH bytes of data from remote terminal and store it in the memory at address 2000H:2000H? [16]

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1. (a) Explain various interrupt of 8085 Microprocessor and their priorities.
(b) Explain the
 - i. SID
 - ii. SOD
 - iii. S_0, S_1 ,
 - iv. $\overline{INTA}$ pins of 8085 Microprocessor. [8+8]
2. (a) Explain the Execution unit of 8086.
(b) Explain about memory segmentation and Queue. [8+8]
3. (a) Explain the following Instructions.
 - i. LDS
 - ii. PUSHF
 - iii. XLAT
 - iv. XCHG.
(b) Write a program to convert a BCD Number to a Binary Number. [8+8]
4. Write a FAR procedure SER_ WORD that searches a word array for a given word and sets the value of a word parameter to the index of the element in the array if a match is found; otherwise, it puts a -1 in the index word parameter. The parameters are to be passed to the procedure via a parameter address table. Give a sequence for calling SER_ WORD to search ARRAY_ 1 of length LENGTH_ 1 for variable ?ID? and put the index in INDEDX_ 1? [16]
5. (a) Explain string instructions supported by 8086 processor?
(b) Give the instruction sequence that compares the first 10 bytes beginning at STRG_ 1 with the first ten bytes beginning at STRG_2 and branches to MATCH if they are equal, otherwise continues in sequence? [8+8]
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? [8+8]

7. What is the difference between simple I/O, strobbled I/O and bi-directional I/O with reference to 8255? Discuss the required control signals and their timing sequence for each mode of operation? [16]
8. (a) Why are the two ground pins on an RS-232C connector not just tied together?
(b) Explain the RS-232C to TTL interfacing?
(c) Write a sequence of instructions to communicate to a modem using 8251 at address 080H. [4+6+6]

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1. (a) Explain the components of a Microcomputer.
(b) Explain the following pins of 8085 Microprocessor
 - i. SID, SOD
 - ii. ALE
 - iii. HOLD, HLDA
 - iv. TRAP.

[8+8]
2. (a) Draw and explain the pin out diagram of 8086.
(b) Explain the various operations performed by Bus Interfacing unit in 8086.

[10+6]
3. (a) Explain the following Instructions.
 - i. MOV
 - ii. POP
 - iii. XCHG
 - iv. SAHF.
(b) Write a program to sort an array in descending order

[8+8]
4. (a) Explain with example the necessity of linker in modular programming?
(b) Explain how inter-segment CALL and intra-segment CALL instructions are executed? Clearly mention the changes in stack during the execution of above instructions?
(c) Discuss the five types of interrupts and their use?

[4+8+4]
5. (a) What is a recursive procedure? Write a recursive procedure to calculate the factorial of number N, where N is a two-digit Hex number?
(b) What are the loop instructions of 8086? Explain the use of DF flag in the execution of string instructions.

[8+8]
6. It is necessary to serve 18 interrupt requests using 8259's. The address map for the 8259's is given from 0A00H to 0A0FH. Show the complete interface with 8086 system bus? These 18 interrupts are to be requested from interrupt type 040H on words, with edge triggered mode and auto end of interrupt. Give the initialization sequence for all 8259's.

[16]
7. (a) With neat layout, explain how a microprocessor can be used for data acquisition system using A/D converters and D/A converters?

- (b) Explain the transistor buffer circuit used to drive 7-segment LEDs? [8+8]
8. Write a program to initialize 8251 in synchronous mode with even parity, single SYNC character, 7 bit data character. Then receive 0FFH bytes of data from remote terminal and store it in the memory at address 2000H:2000H? [16]

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1. (a) What are the arithmetic and logical operations performed in 8085 Microprocessor?
(b) What are the different registers in 8085 Microprocessor? Discuss their functions. [8+8]
2. (a) Explain the different types of addressing modes used for indicating branch addresses in 8086.
(b) Explain the timing diagram for a write cycle of 8086. [8+8]
3. (a) Explain the following Instructions.
 - i. LDS
 - ii. PUSHF
 - iii. XLAT
 - iv. XCHG.(b) Write a program to convert a BCD Number to a Binary Number. [8+8]
4. (a) Write a procedure COMPUTE for performing the computation $R \leftarrow X + Y - 3$. The word variables X, Y, R and COMPUTE are in the same code segment. The variables X and Y are defined in data segment D1_SEG. The data segment D2_SEG contains the variable R. Show the necessary definition along with the procedure?
(b) Give the definition of a macro RESTORE that will pop the register contents that have been pushed in the order AX, BX, CX, DX, SI and DI? [8+8]
5. (a) Write a program segment that will copy all ASCII characters in string STG that are enclosed by a pair of parentheses to the string MMSG and store the number of characters moved in COUNT? [7]
(b) Explain the following instructions and their use?
 - i. LODSB
 - ii. CMPSW
 - iii. XLAT. [3+3+3]
6. 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. [16]

7. Write the necessary instruction sequence to initialize 8255 with address 0400H to 0700H for the following combinations.
- (a) Port A in mode 2 and port B as input port in mode 0 without the interrupt driven i/o.
 - (b) Port A in mode 2 and port B as input port in mode 1 with interrupt driven i/o.
 - (c) Port A in mode 0, port c upper half as input ports and port B as input port in mode 1 with interrupt driven i/o.
 - (d) Port A as output port in mode 1 with active interrupt, port B as input port in mode 0 and port C lower half as output port in mode 0. [4+4+4+4]
8. (a) Draw the flowchart showing how synchronous serial data can be sent from a port line using software routine?
- (b) Draw the block diagram of 8237 and explain each block. [8+8]
