

**III B.Tech II Semester Supplementary Examinations,
November/December 2005
MICROPROCESSORS
(Mechatronics)**

Time: 3 hours**Max Marks: 80**

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

1. (a) Explain the difference between Machine Language, Assembly Language and High Level language.
(b) Explain the requirement of a program counter, stack pointer and status flags in the architecture of Intel 8085 Micro process. [8+8]
2. (a) Explain the flag register of 8086.
(b) Explain the concept of memory segmentation.
(c) Explain, when Queue is failing to speed up the execution. [6+6+4]
3. (a) Explain the Fixed part and variable part formats of IN and OUT instructions with examples.
(b) Write a program to check whether the given string is palindrome or not. [8+8]
4. Write a recursive routine to evaluate the following polynomial $Y = A_0 + A_1X + A_2X^2 + A_3X^3 + \dots + A_NX^N$. The coefficients $A_0, A_1, A_2, \dots, A_N$ are to be successive words in memory and all parameter addresses are to be passed via the stack. [16]
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. (a) Draw the block diagram of 8259 and explain each block?
(b) Explain how IRET instruction is executed? [8+8]
7. 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. [8+8]
8. (a) A terminal is transmitting asynchronous serial data at 1200 bd. What is the bit time? Assuming 8 data bits, a parity bit and 1 stop bit how long does it take to transmit one character?

- (b) Draw necessary circuit to interface 8251 to an 8086 based system with an address 0C0H. Write the sequence of instructions to initialize 8251 for synchronous transmission? (Assume the necessary data) [8+8]

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1. (a) What is a Microprocessor?
(b) Explain in detail the pin diagram of 8085 Microprocessor. [6+10]
2. (a) Explain the different types of addressing modes used for indicating branch addresses in 8086.
(b) Develop the machine code for the following
 - i. MOV BX, 2000
 - ii. MOV AX, [6000]
 - iii. MOV CX, DX Take 6 bit code for MOV = 100010 [8+3+3+2]
3. (a) Write a program to move a block of memory with out over lapping.
(b) Write about the following instructions.
 - i. ADC
 - ii. AAS
 - iii. IMUL
 - iv. CBW [8+8]
4. A set of code is reused several times with a separate stack in a program. The reminder of the program uses another stack segment. Define a macro with the necessary instructions at the beginning and end of this set of code in order to switch stacks and then switch back again. Also give the necessary code to define the two stacks and initially set SS and SP? [16]
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. Explain the following terms with reference to 8259?
 - (a) Special mask mode
 - (b) Fully nested mode
 - (c) Read register command

- (d) Poll command. [4+4+4+4]
7. (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? [8+8]
8. (a) How do we connect RS-232C equipment
- i. To data terminal type devices?
- ii. To serial port of SDK 86, RS-232C connection? [4+4]
- (b) Draw the block diagram of 8272 floppy disk controller and explain each block? [8]

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1. (a) Explain the difference between Machine Language, Assembly Language and High Level language.
(b) Explain the requirement of a program counter, stack pointer and status flags in the architecture of Intel 8085 Micro process. [8+8]
2. (a) Explain register to register and register to / from memory with displacement instruction formats with the help of examples.
(b) Explain the different type of addressing modes used in 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) Discuss the difference between intra segment and inter segment procedures? Explain the return procedure in the above cases? Give the sequence of statements for defining the above procedures and return methods?
(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. A logic network is having input variables A,B,C,D. The output variables are given below.

$$W = \overline{A}.\overline{BC} + BCD + A\overline{D}$$

$$X = BD + AC + AB + AD$$

$$Y = \overline{A}.\overline{B} + \overline{A}.\overline{C} + D.\overline{B}$$

$$Z = ABC + ACD + \overline{A}.\overline{BC} + D.\overline{B}$$

The array INPUT_1 contains 10 different combinations of input variables. Write an instruction sequence that determine the outputs for each combination of INPUT_1 array and store the output variables in the string OUTPUT_1. [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 0F0FH. Write an instruction sequence to test the status of each device and store it. [16]

7. 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. [16]
8. Explain with a neat sketch all registers of 8237 and their use in DMA transfer? [16]

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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. (a) Explain the Execution unit of 8086.
(b) Explain about memory segmentation and Queue. [8+8]
3. Explain the following instructions with examples.
 - (a) MOV
 - (b) OUT
 - (c) ADC
 - (d) MUL
 - (e) CWD
 - (f) TEST
 - (g) RCR
 - (h) JNC [8x2=16]
4. Write a recursive routine to evaluate the following polynomial $Y = A_0 + A_1X + A_2X^2 + A_3X^3 + \dots + A_NX^N$. The coefficients $A_0, A_1, A_2, \dots, A_N$ are to be successive words in memory and all parameter addresses are to be passed via the stack. [16]
5. (a) Give the instruction sequence that compares the first 20 bytes beginning at STR1 with the first ten bytes beginning at STR2 and branches to MAT_FOUND if they are equal, otherwise continues in sequence? [8]
(b) Explain the following instructions and the flags that are affected by these instructions.
 - i. SCAS DST
 - ii. STOS DST
 - iii. MOVSW
 - iv. CMPSB [2+2+2+2]
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. It is necessary to initialize interrupt for mode 1 operation of port-A as input and port-B as output in the same mode with the 8255 address map of 0400H to 0700H. Give the complete hardware design to interface 8255 to 8086 processor with this address map? Write the instruction sequence for the initialization of 8255 in the above modes? Give the instruction sequence to change the operation modes of port A, port C lower-half and Port B to mode 0 input ports? [16]
8. (a) What is the difference between 20mA current loop and RS232-C 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. [5+5+6]
