

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

**Time: 3 hours**

**Max Marks: 80**

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

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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
2. Explain the complete Architecture of 8086.
3. (a) Explain the following Instructions.
  - i. MOV
  - ii. POP
  - iii. XCHG
  - iv. SAHF(b) Write a program to convert a Binary Number to a BCD Number.
4. Write a FAR procedure SEARCH that searches a byte array for a given byte 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 SEARCH to search ARY of length LEN for variable ID and put the index in IDX?
5. A logic network is having input variables A,B,C,D. The output variables are given
$$W = \overline{A}.\overline{BC} + ABC + \overline{AD}$$
$$X = AC + BA + AD$$
below.
$$Y = \overline{A}.\overline{B} + \overline{A}.\overline{C} + D.\overline{B}$$
$$Z = ABC + ACD + \overline{A}.\overline{BC}$$

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.
6. (a) Give the instruction format of IN and OUT instructions and explain?  
(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.
- To what interrupt type do these locations correspond?
  - What is the starting address for the interrupt service routine?
7. Write the necessary instruction sequence to initialize 8255 with address 0400H to 0700H for the following combinations.
- Port A in mode 2 and port B as input port in mode 0 without the interrupt driven i/o.
  - Port A in mode 2 and port B as input port in mode 1 with interrupt driven i/o.
  - 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.
  - 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.
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)

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(b) Explain the
  - i. SID
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  - iii.  $S_0, S_1$ ,
  - iv.  $\overline{INTA}$  pins of 8085 Microprocessor
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.
3. (a) Explain the following instructions
  - i. LES
  - ii. POPF
  - iii. SAHF
  - iv. LEA  
(b) Explain the Fixed part and variable part formats of IN and OUT instructions with examples.
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?
5. A logic network is having input variables A,B,C,D. The output variables are given
$$W = \overline{A}.\overline{BC} + ABC + \overline{AD}$$
$$X = AC + BA + AD$$
below. 
$$Y = \overline{A}.\overline{B} + \overline{A}.\overline{C} + D.\overline{B}$$
$$Z = ABC + ACD + \overline{A}.\overline{BC}$$

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.
6. (a) How many initialization command words are required for a single 8259 in an 8086 based system? Explain their format?

- (b) Under what conditions type 0 interrupt is initiated? List out the instructions that may cause type 0 interrupt?
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.
8. (a) Explain different modes of DMA transfer supported by 8237?  
(b) Draw the block diagram of 8251 and explain each block?

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1. (a) What is a Microprocessor?  
(b) Explain in detail the pin diagram of 8085 Microprocessor.
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.
3. (a) Write a program to check whether the given string is palindrome or not.  
(b) Briefly explain about following instructions.
  - i. ADD
  - ii. NEG
  - iii. AAM
  - iv. DIV
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?
5. (a) Write an instruction sequence that converts 4-digit ASCII coded decimal number into ASCII coded hex equivalent number?  
(b) Explain string instructions supported by 8086 processor?
6. (a) What is the purpose of operational command words of 8259? Explain their format and the use?  
(b) What are the different control signals necessary for I/O read and write cycles? Show how these control signals are generated in minimum and maximum modes of 8086?
7. (a) A DAC is interfaced to 8255 with an address map of 0800H to 0803H. Give the hardware design? It is necessary to design a counter type ADC with the same 8255 and DAC using a comparator. Give the necessary hardware? Provide the necessary instruction sequence to store a sample in location sampleone?  
(b) Using the above hardware write the instruction sequence for successive approximation ADC?

8. (a) Write an initialization sequence to operate 8251 in asynchronous mode with 8-bit character size, baud rate factor 64, two stop bits and odd parity enable. The 8251 is interfaced with 8086 at address 082H.
- (b) Write the instruction sequence to re-initialize the above 8251 in synchronous mode with even parity, single SYNC character and 8-bit character size?

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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.
3. Write brief notes on the following.
  - (a) PUSH
  - (b) IN
  - (c) NEG
  - (d) DIV
  - (e) XOR
  - (f) SHR
  - (g) JS
  - (h) ROR
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.
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?
6. (a) Give the instruction format of IN and OUT instructions and explain?  
(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) A DAC is interfaced to 8255 with an address map of 0B00H to 0B03H. It is necessary to design an ADC with the same 8255 and DAC using a comparator. Give the necessary hardware?
- (b) Using the above hardware write the instruction sequence for successive approximation ADC and counter type ADC?
- 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?

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