

III B.Tech I Semester Regular Examinations, November 2006
INTERFACING THROUGH MICROPROCESSORS
(Common to Computer Science & Engineering, Information Technology
and Computer Science & Systems Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

1. (a) If an absolute address of the type 6A3D9H is given, express it in the form of CS : IP and explain what are the advantages of the memory segmentation. Discuss about the various segment registers in 8086.
(b) What are the modes in which the 8086 can be used .How many lines are there in the multiplexed bus of 8086. Give the pin diagram separately for each mode of operation. [8+8]
2. (a) Develop an 8086 assembly language program to find the LCM of two 16-bit unsigned integers.
(b) Develop an 8086 assembly language program to find the GCD of two 16-bit unsigned integers. [8+8]
3. (a) What condition or conditions will terminate the repeated string instruction REPNE SCASB ? and also describe what the CAMPSB instructions accomplish ?
(b) Develop a sequence of instructions that scan through a 300 H byte section of memory called LIST located in the data segment searching for a 66 H [8+8].
4. (a) What is the mode and I/O configuration for ports A,B and C of an 8255 after its control register is loaded with 82H.
(b) What control word must be written in to the control register of the 8255 so that Port A is configured for bidirectional operation and port B is set up with mode 1 outputs
(c) In a maximum mode system, which device produces the input, output and bus control Signals for the I/O interface. [6+6+4]
5. (a) Explain with a neat diagram interfacing of 8257 with 8086 .
(b) Write the programming features of 8275 DMA controller. [10+6]
6. Explain how eight ON/OFF switches can be interfaced with a microprocessor using 8255 port. Give the hardware and software for it. [16]
7. Draw the block diagram of a floppy disk controller and explain the functions of each module in it [16]
8. (a) Explain the physical communication standards required to communicate between computer-computer communication or human-computer communication over long and short distances.

- (b) Draw the circuits for driving and receiving 20mA loop signals and explain theushright [8+8]

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(b) Develop an 8086 assembly language program to find the GCD of two 16-bit unsigned integers. [8+8]
3. (a) Develop a 8086 assembly language program with a procedure named BCD_BIN, which converts BCD numbers to binary. Use the AL register to pass parameters to the procedure.
(b) How do you make the above procedure named BCD_BIN as a re-entrant procedure? [8+8]
4. (a) Draw 8255 internal architecture and explain each block.
(b) Explain the control word format of 8255 PPI. [10+6]
5. (a) Draw a flow chart for interrupt processing sequence and explain.
(b) Explain operational command words of 8259 with examples [8+8]
6. Explain how a seven segment LED can be interfaced to the microprocessor. Give the hardware and software for it. [16]
7. (a) Explain three major tasks involved in keyboard interface.
(b) What is 'KEY BOUNCE' ? Explain different key bouncing techniques.
(c) What is the use of strobe signal for interfacing? [4+8+4]
8. (a) Draw the block schematic of a serial communication Interface and explain how serial data communication takes place?
(b) Summarize the RS-232 C control line definitions [8+8]

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2. Develop an 8086 assembly language program for the following:
(a) to sum the numbers from 1 to 100
(b) to count the total number of negative numbers in the given series. [8+8]
3. (a) Write short notes on the following string data transfer instructions :
 - i. LODS
 - ii. STOS
 - iii. MOVS(b) Explain what the REPE prefix does when coupled with the SCASB instruction ? [12+4]
4. (a) What kind of I/O interface does a 8255 implement, and how many I/O lines are available on the 8255
(b) What is the function of the port B lines of the 8255 when port A configured for mode 2 Operations
(c) Explain about maximum mode interrupt interface [6+4+6]
5. (a) Explain initialization sequence of 8259
(b) What I/O addresses are assigned to the registers of the DMA controller? And to the DMA Page register
(c) Overview the DMA request / acknowledge handshake sequence ? and what is the function Of the DMA page register [4+6+6]
6. (a) Explain a transistor buffer circuit used to drive 7-segment LED's .
(b) Explain with a block diagram the usage of 8048 microcontroller for keyboard interfacing. [8+8]
7. (a) Explain the working of Flash ADC.

- (b) What is the resolution of a 13-bit DAC? If the DAC has a full-scale output of 10V, what is the size of each step and what is the actual maximum output voltage? [6+10]
8. (a) Explain the working of 8251 A
- (b) Give the sequence of Instructions to initialize 8251A. [8+8]

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2. (a) Develop an 8086 assembly language program for performing an unsigned binary division on a 32-bit word by a 16-bit word.
(b) What are assembler directives? Explain with examples. [10+6]
3. Develop an 8086 assembly language program to compute nCr using recursive procedure. Assume n and r to be positive integers and place the binary result in a memory word location. [16]
4. (a) Describe memory-mapped I/O and direct I/O. Give the main advantages and disadvantages of each.
(b) Show the truth Table for a 3625 PROM decoder to produce \overline{CSI} signals for 4Kx8 RAMS in an 8086 system. Assume that the first RAM starts at address 00000H. Also draw the circuit connections. [6+10]
5. (a) What is minimum no. of bus cycles that can occur between the time an interrupt request is recognized and the first instruction in the interrupt routine is fetched. Draw the bus cycles.
(b) Write an instruction sequence that will cause the priority of an 8259, whose even address is 08A0, to be IR4, IR5, IR6, IR7, IR0, IR1, IR2, IR3. Solve this twice, once assuming that the highest priority is currently IR0 and once assuming that it is IR3. [6+10]
6. Write 8086 procedures for a 4×4 matrix keyboard.
 - (a) Detecting a key press
 - (b) Key debouncing
 - (c) Key encoding [5+5+6]
7. (a) Explain Power MOSFET and IGBT circuits used to drive Motor windings.

- (b) Write an algorithm and procedure for driving a stepper motor. Assume the desired direction of rotation is passed to the procedure is AL and the number of steps is passed to the procedure is CX. Write a delay routine for 20 milliseconds after each step movement. [6+10]
8. (a) Explain the physical communication standards required to communicate between computer-computer communication or human-computer communication over long and short distances.
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