

III B.Tech. I Semester Supplementary Examinations, May -2005
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) Discuss with diagram the system bus cycle of 8086. Why are wait cycles needed. Compare wait and idle cycles.
(b) What are the loops in the instruction set of the 8086. Explain the use of DF flag in the execution of string instructions.
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.

3. From the following pseudo code draw a detailed flowchart which indicates the elementary constructs and then translate it into 8086 program.

```
CODE ← 0
IF A = 0 THEN
  IF B = 0 THEN
    CODE ← 1
  ELSE
    CALL DIVIDE to compute  $X1 ← -C/B$ 
  ENDIF
ELSE
  CALL EVAL to compute  $E ← -B/2A$ 
  CALL DISCRIM to compute  $D ← (-B/2A)^2 - C/A$ 
  IF  $D < 0$  THEN
    CODE ← 2
  ELSE IF  $D = 0$  THEN
     $X1 ← E$ 
    CODE ← 3
  ELSE
    CALL SQROOT to compute  $F ← \text{sqrt}(D)$ 
    CALL SUBTRACT to compute  $X1 ← E - F$ 
    CALL ADDITION to compute  $X2 ← E + F$ 
  ENDIF
ENDIF.
```

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 convections.
5. An 8086 system has a DMA controller 8257 interfaced such that address of its mode set register is F8H and address of its DMA address register of channel 0 is F0H. Write an ALP to read 2K bytes of data from location 5000H:2000H in the system memory to a Peripheral on channel of the DMA controller. Disable all other channels, program TC stop, No autoloading is required, fixed priority
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.
7. Explain write pre-compensation, data separation, phase locked loop and CRC in floppy disk interface.
8. (a) List out the steps involved in initializing 8251A for synchronous operation.
(b) Give the general message format for BISYNC communication and explain.

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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.
2. (a) Develop an 8086 assembly language program to copy a block of data from memory location MEMA to MEMB.
(b) Develop an 8086 assembly language program to sort a given set of 16-bit unsigned integers into ascending order using insertion sort technique.
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.
4. (a) Why buffers are needed on the address, data, and control buses in a micro-computer system ?
(b) Draw the structure of fully buffered 8086 microprocessor with the demultiplexed address and data buses.
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. Write an 8086 program to read a string of characters entered from the keyboard, put the key codes in a buffer in memory and display the characters for the pressed keys on the CRT.
7. Explain the working principle of a digital-to-analog converter and how it can be interfaced. Give the hardware and software for it.

Code No: RR310501

Set No.2

8. (a) Write a note on IEEE 488 bus standard listener, talker and controller
(b) Write a short note on Microprocessor Development system.

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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.
2. (a) Write briefly about the importance of the 8086 LOOP instructions.
(b) Write an 8086 assembly language program sequence which uses the LOOP instruction to add the contents of M words beginning at the address ARRAY and stores the result in TOTAL.
3. (a) Compare the usage of procedures with macros in assembly language programming.
(b) Explain briefly the way you define and call a macro without parameters in an 8086 assembly language programming.
4. An 8086 system with 8255 interfaced at port A address F0H, as a block of 100 data bytes Stored in it. Another 8086 system with another 8255 interface at port A address 80H has another block of 100 data bytes stored in it. Interchange this blocks of data bytes between the two 8086 systems. Draw the necessary hardware scheme and write the necessary sequence of instructions. Both systems run on the same clock rate.
5. (a) Draw a flow chart for interrupt processing sequence and explain.
(b) Explain operational command words of 8259 with examples
6. (a) Design a circuit to activate a actuator, based on a bit combination given by eight switches interfaced to a microprocessor
(b) Design a interface circuit to feed numbers 0-9 through a linearly encoded switches and to display the number on a seven segment LED through a microprocessor
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?

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Set No.3

8. Explain in detail the sequence of steps involved in transferring the data using the General Purpose Interface Bus.

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1. (a) Distinguish between interrupts and exceptions, and also Explain how these interrupts and exceptions are handled in 8086 microprocessor.
(b) Explain the functions of the following pins in 8086 microprocessor.
 - i. \overline{BHE}
 - ii. LOCK
 - iii. MN/\overline{MX}
 - iv. READY
 - v. \overline{TEST}
2. (a) What is the purpose of BREAK directive ?
(b) Develop a short sequence of 8086 instructions that uses the REPEAT- UNTIL construct to copy the contents of byte-sized memory BLOCKA into byte-sized memory BLOCKB until a 00H is moved.
3. What are the major ways of passing parameters to and from procedures ? Explain the method with an example.
4. Draw the schematic diagram of 8255 PPI and explain different modes of operation of 8255 with example.
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. (a) Design a circuit to activate an actuator, based on a bit combination given by eight switches interfaced to a microprocessor
(b) Design an interface circuit to feed numbers 0-9 through a linearly encoded switches and to display the number on a seven segment LED through a microprocessor
7. Design a microprocessor based system to control the water level of a tank

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 the flow chart showing how asynchronous serial data can be sent from a port line using a software routine.
- (c) Why are the two ground pins on an RS-232C connector not just jumpered together?
