Set No. 1

II B.Tech II Semester Supplimentary Examinations, Aug/Sep 2008
MICROPROCESSORS AND INTERFACING
**(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

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1. (a) Distinguish between microprocessors and micro-computers? Explain.
   (b) Explain the register organization of INTEL 8085 microprocessor. Discuss the advantage of register pair. [8+8]

2. (a) Write a program to check whether the given string is palindrome or not.
   (b) Briefly explain about following instructions. [8+8]
       i. ADD
       ii. NEG
       iii. AAM
       iv. DIV.

3. (a) Write a program to find the smallest and biggest numbers in a given array.
   (b) Explain with simple examples how the string manipulation instructions in 8086 are useful in block transfer of data. [8+8]

4. (a) What is the purpose of ALE, $\overline{BHE}$, DT/$\overline{R}$ and $\overline{DEN}$ pins of 8086? Show their timing in the system bus cycle of 8086?
   (b) Write an 8086 ALP to multiply two 8-bit numbers using SHIFT and ADD method. Store the result in DX register. [10+6]

5. (a) What do you mean by BSR mode? Explain the BSR mode of operation.
   (b) Initialize the Port-A as input port in mode-1. Explain the data transfer scheme used through Port-A with the help of handshaking signals. Draw the timing diagram. [7+9]

6. Write the initialization instructions for master and slave configuration to meet the following specifications: [16]

   (a) The INTR of slave is routed through IR2 of the master 8259 to the 8086.
   (b) Master and slave are both level triggered.
   (c) First interrupt types for master and slave are 32 and 64 respectively.
   (d) Modes: automatic rotation and auto end of interrupt.
   (e) Addresses of the master are 40H and 41H and the slave are 80H and 81H.
   (f) Buffers are not used.

7. (a) Explain the operation of 8251 in Synchronous mode of communication.

   (b) Write short note on RS-232C standard. [8+8]

8. (a) Explain various operation modes of Timer-1 and Timer-0.

   (b) Describe the Timer control (TCON) and Timer mode control (TMOD) registers. [16]

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1. (a) Explain what are the advantages of the memory segmentation. Discuss about various segment registers in 8086.

   (b) Explain the physical memory organization in 8086. How is it differ from 8088.
   [8+8]

2. List out the assembler directives of 8086? And explain them with Examples? [16]

3. (a) Explain string instructions supported by 8086 processor?

   (b) Give the instruction sequence that compares the first 10 bytes beginning at STRG1with the first ten bytes beginning at STRG 2 and branches to MATCH if they are equal, otherwise continues in sequence? [8+8]

4. (a) Draw the circuit of wait state generation, which generates between 0 and 7 wait states and draw the corresponding timing diagram.

   (b) How is an 8086 entered into an wait state ? And how many wait states can be inserted in a machine cycle. [12+4]

5. Write the necessary instruction sequence to initialize 8255 with address 0200H to 0203H for the following combinations:

   (a) Port-A as input port in mode-1 and Port-B as input port in mode-1 with 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 as output port in mode-0 and Port-C upper half as input port in mode-0, and Port-B as output port in mode-1 with interrupt driven I/O.

   (d) Port-A as output port in mode-1 with active interrupt, Port-B as output port in mode-0 and Port-C lower half as input port in mode-0. [4 × 4]

6. (a) Discuss the sequence of operations performed in the interrupt acknowledge cycle.

   (b) What is the difference between RET and IRET? Discuss the result, if RET instruction is placed at the end of the interrupt service routine.

   (c) What is the vector address of type-50H interrupt? [6+6+4]

7. (a) Give the specifications of RS-232C.

(b) How do we connect RS-232C equipment: [6+10]
   i. To data terminal type devices.
   ii. To serial port of SDK-86, RS-232C connection.

8. (a) Enlist salient features of 8051 family of microcontrollers.

   (b) Explain with waveforms, different modes of Counter / Timer in 8051. [8+8]

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Set No. 3

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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) Write notes on the following:
      i. RCL
      ii. SHR
      iii. JAE
      iv. LOOP.

   (b) Describe various addressing modes used in 8086. [8+8]

3. (a) Write a program to find the smallest and biggest numbers in a given array.

   (b) Explain with simple examples how the string manipulation instructions in 8086 are useful in block transfer of data. [8+8]

4. (a) What are the two modes of 8086? List out various signals generated by the CPU in these two modes respectively.

   (b) Design a memory system around 8088 that has a total of 16 K × 8 EPROM and 32 K × 8 RAM. Both EPROM and RAM chips are available in modules of 8K × 8. The memory map is specified as below:
      EPROM 1 : F0000 H - FIFFFH.
      EPROM 2 : Decide suitably for a practical system.
      RAM 1   : Contains interrupt vector table.
      RAM 2   : 30000 H- 31FFF H
      RAM 3   : 40000 H- 41FFF H
      RAM 4   : 50000 H- 51FFF H   [4+12]

5. Explain why 8255 ports are divided into two groups? Discuss how these groups are controlled in different modes of operation? Explain different control signals and their associated pins for bi-directional I/O mode of operation. [16]

6. At what time the INTR signal is recognized by 8086 processor? Show the timing diagram, assuming that INTR is active. Explain interrupt acknowledge cycle with its associated timing diagram. [16]

7. (a) Define the term MODEM and explain why a MODEM is required to send digital data over standard switched phone-lines.

 (b) Show the bit pattern for the mode word and the command word that must be sent to an 8251 to initialize the device as follows:
   Baud rate factor of 64, 7-bits per character, even parity, 1 stop bit, transmit interrupt enabled, DTR and RTS asserted, Error flags reset, No hunt mode, No break character. [8+8]

8. An 8051 based system requires external memory of four 8 K bytes of SRAM each and two chips of EPROM of size 4 K bytes. The EPROM starts at address 1000H. SRAM address map follows EPROM map. Give the complete memory interface.
[16]

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1. (a) Explain the functions of different registers in 8086. Explain with examples. the various flags of 8086 and their conditions in various instances.

   (b) How are procedure CALL and RET take place in 8086 programming? [12+4]

2. (a) Explain in detail the coding template for MOV instruction of 8086?

   (b) It is necessary to declare a program as a public procedure to be accessible by other programs? Give the sequence of assembly language statements? An external program called "fact" is to used in this program. Show the required statements? [8+8]

3. (a) Write the sequence of statements that declare the word named NWORD and the FAR label EXTMOD as being external and the variable LWORD and the label LOCMOD as being local and accessible by other source modules?

   (b) How could you use the TEST instruction (or a sequence of TEST instructions) to see if bits zero and four in the AL register are both set to one? How would the TEST instruction be used to see if either bit is set? How could the TEST instruction be used to see if neither bit is set? [8+8]

4. (a) What are the registers available in 8257? What are their functions?

   (b) Draw and discuss the status registers of 8257? [8+8]

5. (a) Explain the control word format of 8255 in I/O mode and BSR mode.

   (b) Interface an 8255 with 8086 so as to have Port-A address BCD1H, Port-B address BCD3H, Port-C address BCD5H and Control word register address BCD7H. [8+8]

6. Explain the following interrupts:

   (a) Divide-by-zero interrupt

   (b) Single step interrupt

   (c) Break point interrupt

   (d) Overflow interrupt. [4 × 4]

7. (a) Explain the line driver and the line receiver circuits of serial communication.

   (b) What do you mean by I/O mapped I/O? Draw the interfacing of 8251 with 8086 in I/O mapped I/O mode. [8+8]

8. Draw the port pin circuits of all the ports of 8051 and explain about each port pin circuit clearly. [16]

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