III B.Tech II Semester Regular Examinations, Apr/May 2006
MICROPROCESSORS AND INTERFACING
(Common to Electrical & Electronic Engineering, Electronics & Communication Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Electronics & Control Engineering and Electronics & Telematics)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What is the length of the instruction queue in 8086? Discuss the use of the queue? Explain the reason for limiting the length of queue?
   (b) What is the minimum number of segment resisters that are necessary to provide segmentation? How do access common data for different programs using segmentation? [8+8]

2. (a) Discuss various branch instruction of 8086 microprocessor, that are useful for relocation?
   (b) Using a do-while construct, develop a sequence of 8086 instructions that reads a character string from the keyboard and after pressing the enter key the character string is to be displayed again. [6+10]

3. (a) What is the purpose of ALE, BHE, DT/$\overline{R}$ and $\overline{DEN}$ pins of 8086? Show their timing in the system bus cycle of 8086?
   (b) Why 8086 memory is mapped into 2 byte wide banks? What logic levels are found with BHE and A0 when 8086 reads a word from the address 0A0AH?

   [10+6]

4. 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? [4+6+6]

5. (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?[8+8]

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? [10+6]

7. (a) Discuss the organization of FLASH memory? Explain the FLASH memory command definitions?

(b) With the help of basic cell explain SRAM and DRAM? Discuss the advantages and disadvantages of the above memories? [6+10]

8. Discuss the following signal descriptions?

(a) ALE/PROG
(b) $\overline{EA}/V_{PP}$
(c) $\overline{PSEN}$
(d) RXD
(e) $\overline{INT_o}$ / $\overline{INT_1}$
(f) TXD
(g) T_0 AND T_1
(h) $\overline{RD}$ [8x2=16]

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Code No: RR320202 **Set No. 2**

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1. (a) Draw the block diagram of 8086 and explain each block?
   (b) Discuss the addressing modes provided by 8086 and explain with examples? [8+8]

2. It is necessary to define a block of data in 8086 assemble language program. The length of the block is 80,000 Bytes. Give the initialization of data segment for the above data? It is necessary to exchange second element and 70000^{th} element in the above. Give the sequence of instructions to perform the above operation? [16]

3. What is function of ready pin in 8086. Draw the circuit diagram for wait state generation between 0 and 7 wait states and draw the corresponding timing diagram. [16]

4. 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? [4+6+6]

5. (a) Discuss Overrun error and Framing error with reference to 8251?
   (b) Discuss the mode instruction format of 8251 for synchronous and asynchronous mode of operation?
   (c) Explain single transfer mode and block transfer mode of 8237? [5+5+6]

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? [10+6]

7. (a) Explain the following terms with reference to DRAM
      i. Write cycle
      ii. Access time
      iii. Refresh
      iv. Read cycle [4x2=8]

(b) Design the required logic to generate read, write control signals for memory and I/O in a target system using 8086 microprocessor? Generate bank select signals for even and odd address memory banks? [8]

8. (a) Explain the alternate functions of Port 0, Port 2 and Port 3?

(b) Discuss the interrupt structure of 8051? Mention the priority? Explain how least priority is made as highest priority? [9+7]

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Code No: RR320202 **Set No. 3**

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

Answer any FIVE Questions
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1. (a) Explain the use of addressing mode? It is necessary to move a byte from location 4000H:2000H to 4000H:2005H. Give all possible methods using 8086 addressing modes?
   (b) What is memory segmentation? Explain the use of segmentation in different applications? Explain how segmentation provides effective task switching mechanism? [8+8]

2. (a) Explain in detail the coding template for 8086 MOV instruction?
   (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. Explain the following data transfer schemes.
   (a) Programmed I/O
   (b) Interrupted I/O
   (c) DMA [5+5+6]

4. 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. [6+10]

5. (a) How do we connect RS-232C equipment
      i. To data terminal type devices?
      ii. To serial port of SDK -86, RS-232C connection?
   (b) Give the specifications of RS-232C. [5+5+6]

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? [10+6]

7. In an SDK-86 kit 128KB SRAM and 16KB EPROM is provided on system and provision for expansion of another 64KB SRAM is given. The on system SRAM address map is from 00000H to 1FFFFH and that of EPROM is from FC000H to FFFFFH. The expansion slot address map is from 80000H to 8FFFFH. The size of SRAM chip is 32KB. EPROM chip size is 8KB. Give the complete memory interface and also the address map for individual chips? [16]

8. Draw and discuss the formats and bit definitions of the following SFR's in 8051 microcontroller?

   (a) PSW

   (b) IE

   (c) SCON

   (d) TMOD [4x4=16]

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Code No: RR320202 **Set No. 4**

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1. It is necessary to check weather the word stored in location 3000H:2000H is zero or not. Show all possible ways of testing the above condition using different addressing modes and store 0FFH if the condition is satisfied in location 3000H:2002H. Otherwise store 00H. [16]

2. Develop an 8086 assembly language program that reads a key from the keyboard and converts it to uppercase before displaying it. The program needs to terminate on typing the 'Crtl + C' key combination. [16]

3. (a) What is the purpose of ALE, BHE, DT/$\overline{R}$ and $\overline{DEN}$ pins of 8086? Show their timing in the system bus cycle of 8086?
   (b) Why 8086 memory is mapped into 2 byte wide banks? What logic levels are found with BHE and A0 when 8086 reads a word from the address 0A0AH?

   [10+6]

4. 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 hard ware 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]

5. (a) With a neat sketch explain 8237 DMA controller and its operation? [8]
   (b) 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]

6. Explain the following terms with reference to 8259.
   (a) END of interrupt
   (b) Automatic rotation
   (c) Poll command
   (d) Read resister command. [4x4=16]

7. (a) Discuss the organization of FLASH memory? Explain the FLASH memory command definitions?

   (b) With the help of basic cell explain SRAM and DRAM? Discuss the advantages and disadvantages of the above memories? [6+10]

8. (a) Discuss the interrupt structure of 8051? Mention the priority? Explain how least priority is made as highest priority?

   (b) Explain the support given in 8051 instruction set to handle bit addressable RAM? [8+8]

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