

III B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
MICROPROCESSORS AND INTERFACING
(Common to ECE, EIE, BME, ETM)

Time: 3hours

Max. Marks: 80

Answer any FIVE questions
All Questions Carry Equal Marks

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- 1.a) Explain the function of the following signals of 8086.
 (i) ALE , (ii) \overline{TEST} , (iii) $HOLD$, (iv) NMI ,
 (v) \overline{BHE} , (vi) DT/\overline{R} , (vii) $READY$, (viii) \overline{DEN}
- b) Explain the physical address formation in 8086. [12+4]
- 2.a) Write an 8086 assembly language program to find out the number of positive numbers and negative numbers from a given series of signed numbers.
 b) Write an 8086 assembly language program to convert a 16-bit binary number into equivalent BCD number. [8+8]
- 3.a) What is the major difference between an 8086 operating in minimum mode and an 8086 operating in maximum mode?
 b) Draw and discuss the minimum mode 8086 system with relevant read and write cycle timing diagrams. [4+12]
- 4.a) Explain the control word format of 8255 in I/O and BSR mode.
 b) Write an ALP in 8086 to generate a symmetrical square waveform with 1KHz frequency? Give the necessary circuit setup with a DAC? [8+8]
- 5.a) Explain various DOS and BIOS interrupts. Give necessary examples.
 b) Draw the block diagram for multiple 8259A based interrupt system. [8+8]
6. Interface 8251 with 8086 at address 40H. Initialize it in asynchronous transmit mode, with 7 bit character size, baud rate factor 16, one start bit, one stop bit, even parity enable. Further transmit a message "BEST OF LUCK" in ASCII from to a modem?[16]
- 7.a) What are the salient features of 80286 in real address mode?
 b) List out the advantages and features of RISC architecture. [8+8]
8. Draw and explain the internal architecture of 8051 microcontroller. [16]

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1. What is meant by an addressing mode? Explain the different addressing modes supported by 8086 with suitable examples. [16]
- 2.a) Write an 8086 assembly language program to arrange a given series of hexadecimal bytes in ascending order.
- b) Write an 8086 assembly language program for addition of two 3×3 matrices. The matrices are stored in the form of lists (row-wise). Store the result of addition in the third list. [8+8]
- 3.a) Explain how static RAMs are interfaced to 8086. Give necessary interface diagram assuming appropriate signals and memory size.
- b) Explain the need of DMA. Discuss in detail about DMA data transfer method. [8+8]
- 4.a) Explain the architecture of 8279 keyboard display controller with the help of a neat diagram.
- b) Distinguish between Mode set control word and BSR control word of 8255? [10+6]
- 5.a) List and describe in general terms the steps an 8086 will take when it responds to an interrupt.
- b) Explain the transfer of control for nested interrupts in 8086 with an example. [8+8]
- 6.a) Give an overview of RS-232C serial data standard.
- b) Draw the interface circuits for data conversion from
 - (i) TTL to RS232C.
 - (ii) RS 232 C to TTL. [8+8]
- 7.a) Draw and explain the internal block diagram of 80286.
- b) List out the salient features of 80386. [12+4]
- 8.a) Explain about memory and I/O addressing of 8051.
- b) Describe the various timer modes of operation in 8051. [8+8]

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- 1.a) What is an assembler directive? Explain the following assembler directives:
 (i) ASSUME, (ii) EQU, (iii) LABEL, (iv) OFFSET
- b) Draw the register organization of 8086 and explain typical applications of each register. [8+8]
- 2.a) Write an 8086 assembly language program to find the product of two 3×3 matrices. The matrices are stored in the form of lists (row-wise). Store the result in the third matrix.
- b) Write an ALP in 8086 to exchange a block of N bytes of data between source and destination. [8+8]
- 3.a) What is the major difference between an 8086 operating in minimum mode and an 8086 operating in maximum mode?
- b) Draw and discuss the maximum mode 8086 system with relevant read and write cycle timing diagrams. [4+12]
- 4.a) Draw and explain the stepper motor interface to 8086 and write small program to rotate stepper motor in clock wise and anticlockwise direction.
- b) Explain the A/D converter interface to 8086 microprocessor. [8+8]
- 5.a) Explain the interrupt response sequence of 8086 with the help of a block diagram.
- b) Describe the purpose of 8086 interrupt vector table. [8+8]
- 6.a) Why is synchronous serial data communication much more efficient than asynchronous communication?
- b) Explain with a neat diagram the working of 8251 PCI. [4+12]
- 7.a) What is meant by paging? Draw and discuss the paging mechanism of 80386.
- b) What are the salient features of a Pentium machine? [8+8]
- 8.a) Explain the salient features of 8051.
- b) Write short notes on interrupt in 8051. [8+8]

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- 1.a) What are the different instruction types of 8086?
- b) Explain the following instructions of 8086 with suitable examples:
 (i) LEA, (ii) CMP, (iii) DAA, (iv) CBW
 (v) MUL, (vi) RCR, (vii) CMC, (viii) JBE [4+12]
- 2.a) Write an ALP in 8086 to find a maximum number in the array of 10 numbers.
- b) Write an ALP in 8086 to add two 16-digit packed BCD numbers. [8+8]
- 3.a) Describe how the control bus signals are produced for an 8086 system operating in maximum mode.
- b) Describe the series of actions that a DMA controller will perform after it receives a request from a peripheral device to transfer data from the peripheral device to memory. [8+8]
- 4.a) What is the sensor matrix mode of 8279? Explain the function of the 8 × 8-bit RAM in this mode.
- b) Explain the function of the following signals of 8279.
 (i) SL₀ – SL₃, (ii) RL₀ – RL₇, (iii) IRQ, (iv) CNTL / STB [8+8]
- 5.a) With the help of the internal block diagram, explain the working of 8259 priority interrupt controller.
- b) Explain the various hardware and software interrupts in 8086 microprocessor. [10+6]
- 6.a) 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/character, even parity, 1 stop bit, transmit interrupt enabled, receive interrupt enabled, \overline{DTR} and \overline{RTS} asserted, error flags reset, no hunt mode, no break character.
- b) Brief about USB. Explain the functionality of various lines on USB. [8+8]
- 7.a) Draw and discuss the register set of 80386 and explain a typical function of each of the registers in brief.
- b) List out the advantages and features of RISC architecture. [8+8]
- 8.a) Explain the format and bit definitions of the following SFRs in 8051:
 (i) TMOD, (ii) TCON, (iii) SCON, (iv) IP
- b) How does 8051 differentiate between the external and internal program memory. [12+4]

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