Microprocessors VTU CBCS Question Paper Set 2018

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10EC/TE62

Sixth Semester B.E. Degree Examination, June/July 2014
Microprocessors

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Make suitable assumptions for any missing data.

PART – A

1 a. Determine the appropriate register/memory locations that are used to compute the 5 digit hex address when the processor needs to address the contents of
   i) Data segment memory.
   ii) Program segment memory.
   iii) Stack segment memory.
   iv) Extra segment memory. **(08 Marks)**

   b. Explain the flag register of the processor in accordance with the respective bit positions. **(05 Marks)**

   c. Write an 8086 assembly code to copy the contents of flag register into accumulator register following any arithmetic or logical operation. **(07 Marks)**

2 a. Explain the meaning of the following independent bits of 8086 assembly instruction templates: i) W-bit; ii) d-bit; iii) v-bit; iv) s-bit; v) z-bit. **(10 Marks)**

   b. Write an optimum number of assembly instructions for the following objectives. Also indicate the type of addressing mode used in each case.
   i) Shift the contents of accumulator register 4 bits left.
   ii) Rotate the contents of base register right by 2 bits.
   iii) Divide the contents of accumulator register by 2.
   iv) Multiply the contents of base register by 4.
   v) If AL register contains a two digit BCD number, display the same on monitor using necessary DOS interrupts. **(10 Marks)**

3 a. Consider that a symbolic memory address 'DISPTBL' contains a BCD to seven segment code starting from 4000H to 400AH. Design an assembly code to meet the following objectives:
   i) Send a message to screen 'PRESS ANY KEY 0 to 9'.
   ii) Read the key pressed from the key board.
   iii) If invalid key is found, the program to loop back to step (i) with a suitable warning message.
   iv) On correct key press, compute BCD to 7 segment code and store into memory location "DISPCODE'.
   v) Use XLAT assembly instruction to achieve your objective.
   vi) Design a suitable flow diagram to show your approach. **(10 Marks)**

   b. i) Differentiate between the usage of assembler directives MACRO and PROCEDURE.
   ii) Develop a suitable MASM code to display minimum of 3 different line text message by using MACRO directive and PRINTF as macro name. **(10 Marks)**

4 a. With reference to the internal architecture of 8086 processor, explain:
   i) The different external sources external sources of hardware interrupts.
   ii) How the processor checks to see an interrupt have been occurred.
   iii) List of major actions performed to process an interrupt. **(10 Marks)**

   b. Explain the following internal interrupts generated within the processor while executing the program:
   i) TYPE-0 divide by zero interrupt.
   ii) TYPE-1 single step interrupt. **(10 Marks)**

PART – B

5 a. With respect to programmable peripheral interface (PPI) 8255A:
   i) Draw a neat block schematic showing its functional description.
   ii) Draw mode definition format the control word.
   iii) Explain various possible modes of operation. **(10 Marks)**

   b. Design an 8255 based event counting system. Port A is connected to 8LEDs and Port B is connected to a toggling switch having 2 positions for binary and BCD. Draw the interfacing diagram and a program for binary or BCD count as selected by switch. Given that the control port address is 50B3, assume safe current to glow each LED is 25mA. A suitable delay between counts is considered. **(10 Marks)**

6 a. What is meant by numeric data processor 8087 (NDP)? What are the benefits of interfacing the same with the host processor? **(04 Marks)**

   b. Explain briefly the role played by the following pins of 8087 during interaction.
   i) Bus high enable (BHE/S7).
   ii) Status pins $(\overline{s2},\overline{s1},\overline{s0})$.
   iii) Request/Grant $(\overline{RQ}/\overline{GT})$. **(06 Marks)**

   c. Consider the given decimal number 178.625 convert it into
   i) Short – real format (single precision representation).
   ii) Long-real format (double precision representation). **(04 Marks)**

   d. Write a program to calculate the volume of a sphere having radius of the sphere is specified. The result is to be stored in the memory location VOLUME. Volume of a sphere is given by (4/3) * (Pi) *(r**3). **(06 Marks)**

7 a. Draw a schematic diagram when 8086 processor is operating in maximum mode configuration. **(06 Marks)**

   b. Explain the function performed by pins exclusive for minimum mode configuration.
   i) HOLD and HLDA ; ii) $M/\overline{IO}$; iii) $\overline{RD}$; iv) $\overline{WR}$; v) $MN/\overline{MX}$. **(08 Marks)**

   c. What is meant by PCI bus system? List out the significant characteristics of the PCI bus system. **(06 Marks)**

8 a. Explain the memory bank system architecture for the 80386DX microprocessor with a block schematic. Explain how interleaved memory system is used for speed improvement. **(10 Marks)**

   b. Draw the block schematic of the control register of 80386 microprocessor and explain the following special control bits of operation i) PG; ii) ET; iii) TS; iv) EM; v) MP; vi) PE. **(10 Marks)**

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10EC/TE62

Sixth Semester B.E. Degree Examination, June/July 2015
Microprocessors

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Write the memory map of the TPA in a personal computer and explain each of the areas in brief. **(10 Marks)**

b. Explain the based, indexed, base indexed and relative addressing modes of 8086 with suitable diagrams and examples. **(10 Marks)**

2 a. Write an assembly language program segment to perform (DX) ← up1 + up2 – up3 on two digit 10's complement numbers, where up1, up2 and up3 are unpacked two byte data variable memory locations. **(10 Marks)**

b. Write the flowchart and assembly language program segment to sort numbers in an array A in descending order using bubble sort. Use I as index. **(10 Marks)**

3 a. Write an assembly language program segment to move a block of data between two overlapping areas and explain with diagrams of overlapping. **(10 Marks)**

b. Compare procedure and macro. **(04 Marks)**

c. Write an assembly language program segment to move data from VAR2 to VAR1 and also VAR4 to VAR3 using MOVE MACRO (arguments). **(06 Marks)**

4 a. Draw the interrupt vector table and write the sequence of operations that are performed when an interrupt is recognized. **(10 Marks)**

b. Write the assembly language program segments to set the trap flag and to reset the trap flag. **(06 Marks)**

c. Write the circuit for optically detecting the presence of a new printed circuit –board as it comes out of the machine and keep a count of finished boards, so that we can count any board lost in the machine when a board passes between LED and phototransistor it should signal the NMI input of 8086. Explain the operation of circuit. **(04 Marks)**

PART – B

5 a. Interface a 4 × 4 matrix keyboard to 8086 through 4 – bit output port for rows and 8 – bit input for columns. Draw the flowchart and explain the procedure for key press, de-bounce and encoding of the key pressed. **(10 Marks)**

b. With a neat diagram interface the multiplexed 4 – digit LED display to microcomputer. Explain the principle of operation. **(10 Marks)**

6 a. Draw the block diagram of 8087 and explain. **(10 Marks)**

b. Write the 8087 assembly language program sequence for computing the sample mean and standard deviation and store them at MEAN and STD – DEV respectively where :

$$\text{Standard deviation (STD - DEV)} = \sqrt{\frac{\sum_{i=1}^{N}(X_i - \text{MEAN})^2}{N-1}};$$

$$\text{sample (MEAN)} = \frac{\sum_{i=1}^{N} X_i}{N}; \; x_1, x_2, - - - - - x_N \text{ are samples : N : number of samples.} \quad \textbf{(10 Marks)}$$

7 a. Write the typical minimum mode system configuration of 8086 with necessary devices and interconnections and explain. **(10 Marks)**

b. Write the ALP segment to initialize, read and write the parallel port printer without ECP. **(06 Marks)**

c. Explain the features of USB. **(04 Marks)**

8 a. Discuss the flag register, debug and test registers of 80386. **(06 Marks)**

b. Explain the salient features of 80486. **(06 Marks)**

c. Draw the block diagram of Pentium processor and explain the function of each block. **(08 Marks)**

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Sixth Semester B.E. Degree Examination, June/July 2016
Microprocessors

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. With a neat diagram explain the internal architecture of 8086. **(08 Marks)**
b. Explain about segment registers and its advantages. **(06 Marks)**
c. Explain about instruction execution time dependency parameters. **(06 Marks)**

2 a. Explain the following instruction function with an example:
(i) LOOP (ii) IMUL (iii) XLAT (iv) AAM **(06 Marks)**
b. What is assembler directive? Explain the following assembler directives:
(i) ASSUME (ii) PUBLIC (iii) ALIGN **(08 Marks)**
c. Write an ALP to perform GCD of two 16-bit integers and comments. **(06 Marks)**

3 a. Write an ALP to perform reversing string along with flow chart. **(08 Marks)**
b. List out two differences between MACRO and PROCEDURE. **(06 Marks)**
c. List and briefly explain String instruction. **(06 Marks)**

4 a. What is interrupt? Explain about dedicated interrupts with respect to 8086. **(08 Marks)**
b. Briefly explain about hardware and software interrupt applications. **(06 Marks)**
c. What are the steps involve during the interrupt response. **(06 Marks)**

PART – B

5 a. What is interfacing? Explain about $m \times n$ matrix keyboard interface diagram along with program and flow chart. **(14 Marks)**
b. Briefly explain about 8255 control word format. **(06 Marks)**

6 a. Explain about control register of 8087. **(06 Marks)**
b. Explain about various data types with respect to 8087. **(06 Marks)**
c. What is co-processor? Why it is called so? Give the significance of 8087 NDP. **(08 Marks)**

7 a. Explain maximum mode operation of 8086 with relevant block diagram. **(10 Marks)**
b. Write a short note on PCI and USB. **(10 Marks)**

8 a. Write the salient features of 80486. **(06 Marks)**
b. Briefly explain about 80386 special registers. **(10 Marks)**
c. Write a note on Pentium processor. **(04 Marks)**

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Sixth Semester B.E. Degree Examination, June/July 2017
Microprocessors

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Explain the architecture of 8086 microprocessor with a neat block diagram. **(10 Marks)**

b. Explain about Instruction execution time dependency parameters. **(05 Marks)**

c. Determine the physical address resulting from the following instructions :
i) MOV DL, [BP + SI] ii) MOV DI, [BX + 100H]
iii) MOV [BP + DI + 5], AH iv) MOV AL, [5036H]
BP = 7000H , SI = 0350H , SS = 8000H
BX = 4FFFH , DS = 2000H AND DI = 6A00H. **(05 Marks)**

2 a. Explain the following instruction function with an example :
i) DAA ii) IDIV iii) AAM iv) XLAT. **(04 Marks)**

b. Opcode for ADD instruction is 000000DW. Determine the machine language code for the following : i) ADD CL, BH ii) ADD 4523 [BX + DI] , DX. **(06 Marks)**

c. What are Assembler directives? Explain the significance of the following :
i) EQU ii) ALIGN iii) DT iv) ASSUME v) MACRO. **(10 Marks)**

3 a. Using table translation instruction write a program to find equivalent seven segment code for the given BCD digit. **(06 Marks)**

b. Explain the following string instructions with examples :
i) MOVSB ii) CMPSB iii) SCASB iv) Repeat prefix (REP). **(08 Marks)**

c. Write a program to check the given string is Palindrome or not and display the suitable message. **(06 Marks)**

4 a. Draw the interrupt vector table and write the sequence of operation that are performed when an interrupt is recognized. **(10 Marks)**

b. Define the following interrupts :
i) Type 0 ii) Type 1 iii) Type 3 iv) Type 4 **(04 Marks)**

c. Write a macro to read a character without echo and read a string of characters from the keyboard. **(06 Marks)**

PART – B

5 a. Explain about mXn matrix key board interface diagram along with program and flow chart. **(10 Marks)**

b. Define Stepper motor. Explain the interfacing of a stepper motor to 8086 microprocessor with necessary circuit diagram. Write an ALP to rotate the stepper motor clockwise by n steps and anti clock wise by m steps. **(10 Marks)**

6 a. With a neat diagram, explain the architecture of 8087 coprocessor. **(10 Marks)**

b. Write 8087 ALP to compute the area of the circle. **(05 Marks)**

c. Convert $(1259.125)_{10}$ in short real, long real and temporary real formats. **(05 Marks)**

7 a. With a neat block diagram, explain the maximum mode operation of 8086. **(10 Marks)**

b. Write short note on : i) PCI and ii) USB. **(10 Marks)**

8 a. Briefly explain about 80386 special registers. **(10 Marks)**

b. Explain the memory system of 80386 with diagram. **(04 Marks)**

c. Write the salient features of 80486. **(06 Marks)**

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Sixth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Microprocessors

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain with block diagram the personal computer model showing address, data and control bus structure. **(05 Marks)**

b. With a neat sketch, explain the execution unit and bus interface unit of the 8086 microprocessor. **(10 Marks)**

c. Explain segmentation in 8086 and advantages of using segment registers. **(05 Marks)**

2 a. Explain the different string instructions of the 8086. **(08 Marks)**

b. What are assembler directives? Explain the following :
(i) total db 00h (ii) inc word ptr [si] (iii) mov dx, offset msg (iv) assume **(08 Marks)**

c. Explain :
(i) MN / $\overline{MX}$ (ii) $AD_{15} - AD_0$ (iii) $\overline{RD}$ (iv) $\overline{WR}$ **(04 Marks)**

3 a. Write a display macro using for statement to display 'VTU' on the screen. **(05 Marks)**

b. Write an assembly language program to arrange '10' bytes of data in descending order. **(10 Marks)**

c. Differentiate between macros and procedures. **(05 Marks)**

4 a. Draw the 8086 interrupt-pointer table and explain the dedicated interrupt pointers, reserved interrupt pointers and available interrupt pointers. **(10 Marks)**

b. Explain the priority of 8086 interrupts. **(05 Marks)**

c. Write a program to check if a given byte is bitwise palindrome. **(05 Marks)**

PART – B

5 a. Explain the different key switches used on keyboards. **(08 Marks)**

b. Explain the detection of matrix keyboard, key press, debouncing and encoding with a microcomputer using 4*4 keyboard. Also draw the flowchart for the same. **(12 Marks)**

6 a. Explain the 8087 architecture. Also explain the bit pattern of status register and control register. **(12 Marks)**

b. Explain :
(i) FLDZ (ii) FLD1 (iii) FLDPI (iv) FLDL2E **(08 Marks)**

7 a. Write a note on parallel printer interface (LPT). **(10 Marks)**

b. Explain the write cycle timing diagram for minimum mode. **(07 Marks)**

c. Explain the following :
(i) M / $\overline{IO}$ (ii) ALE (iii) $\overline{INTA}$ **(03 Marks)**

8 a. Draw the internal programming model of the 80486 and explain. **(10 Marks)**

b. Explain the memory system of 80386. **(05 Marks)**

c. Write a brief mote on Pentium processors. **(05 Marks)**

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Sixth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Microprocessors

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Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With neat sketch explain execution unit of 8086. **(06 Marks)**

b. Define addressing modes for specifying branch address and identify addressing modes of following instructions:
i) MOV [BP + SI + 5], AH ii) MOV AL, [5036] **(06 Marks)**

c. Explain various machine language instruction formats used in 8086 with suitable examples. **(08 Marks)**

2 a. Explain the functions of following instructions with examples:
i) LEA ii) IDIV iii) DAA iv) JNGE **(08 Marks)**

b. Write an assembly level language program to add two 16-digit packed BCD numbers. **(06 Marks)**

c. Explain the following directives and operators with suitable examples:
i) SEGMENT ii) ASSUME iii) DUP iv) SIZE **(06 Marks)**

3 a. Explain the following string instructions with examples:
i) MOVS B ii) CMPS B iii) SCAS B iv) Repeat prefix (REP) **(08 Marks)**

b. Write an Assembly level language program to convert four digit ASCII coded hexadecimal number to binary equivalent using string instructions. **(06 Marks)**

c. Write a recursive procedure to calculate the factorial of N. **(06 Marks)**

4 a. Give the classifications of interrupts in 8086. Explain the 8086 interrupt response mechanism. **(04 Marks)**

b. Explain INT N interrupt instruction? Write a program that outputs characters to printer using INT 17H interrupt. **(08 Marks)**

c. Explain interrupt data input using suitable circuit diagram. Write interrupt service procedure for reading characters from ASCII keyboard. **(08 Marks)**

PART – B

5 a. Write a keyboard procedure that scans the keyboard and returns with numeric code of the key in AL. **(10 Marks)**

b. Interface eight seven segment display, using 8255 with 8086. **(10 Marks)**

6 a. Explain data types of numeric data processor 8087. **(10 Marks)**

b. Represent 11.375_{10} in short real form. **(04 Marks)**

c. Explain functions of following instructions:
i) FLD ii) FADD iii) F2XM1 iv) FLDL2E **(06 Marks)**

7 a. Explain minimum mode configuration of 8086. **(08 Marks)**

b. Explain following with respect to PCI bus

i) PCI bus timing diagram ii) PCI bus commands. **(08 Marks)**

c. Explain types of packets and contents found on USB. **(04 Marks)**

8 a. Give the features of 80386 microprocessor. Explain its memory system and I/O system with suitable diagrams. **(08 Marks)**

b. Explain programming model of 80486 microprocessor with suitable diagrams. **(08 Marks)**

c. Explain basic features of Pentium processor. **(04 Marks)**

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Microprocessors

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PART – A

1 a. Draw the internal architecture of 8086 processor and explain in brief the execution unit and bus interface unit. **(10 Marks)**

b. Explain the PSW register of 8086. **(06 Marks)**

c. List the advantages of memory segmentation of 8086. **(04 Marks)**

2 a. Determine the physical address resulting from the following instructions:
i) MOV DL, [BP+SI]
ii) MOV DI, [BX + 100h]
iii) SUB BOX, AX
iv) MOV [BP + DI + 5], AH
v) MOV AL, [5036h]
BP = 7000h, SI = 0350h, SS = 8000h, BOX = 4000h, BX = 4FFFh, DS = 2000h
DI = 6A00h. **(10 Marks)**

b. Opcode for MOV instruction is 100010. Determine the machine language code for the following:
i) MOV AL, BL ii) MOV AL, [1234h] **(04 Marks)**

c. What are assembler directives? Explain the significance of the following:
i) DW ii) EQU iii) ALIGN 16 iv) OFFSET. **(06 Marks)**

3 a. Write a short note on string instructions. **(10 Marks)**

b. Using table translation instruction WAP to find equivalent seven segment code for the given BCD digit. **(06 Marks)**

c. Differentiate between Macros and Procedures. **(04 Marks)**

4 a. What is an interrupt? Discuss the interrupt classification in 8086 with example. **(07 Marks)**

b. Explain the response to an interrupt in 8086. **(07 Marks)**

c. Write subroutines to
i) Set trap flag ii) Reset trap flag. **(06 Marks)**

PART – B

5 a. Explain with a neat diagram the interfacing of a 4×4 keyboard to 8086. Draw the flow chart also. (Program not reqd.) **(12 Marks)**

b. Interface a DAC AD7523 with 8086 WAP to generate a saw tooth waveform of period 1 ms with V_{max} = 5V. Clock frequency of 8086 = 8 MHz. **(08 Marks)**

6 a. With a neat diagram explain the architecture of 8087 coprocessor. **(10 Marks)**

b. Represent the real number $(13.75)_d$ in a short real or in single precision representation. **(04 Marks)**

c. Write a program in 8087 ALP to find the area of a circle. **(06 Marks)**

7	a.	Draw the block diagram of PCI interface bus and explain.	**(10 Marks)**
	b.	Write a short note on USB.	**(10 Marks)**
8	a.	Explain with neat diagram the programming model of Intel 80386 registers.	**(10 Marks)**
	b.	Explain the memory system of 80386 with diagram.	**(04 Marks)**
	c.	Explain Branch prediction logic and cache structure of Pentium processor.	**(06 Marks)**

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Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the architecture of 8086 microprocessor with a neat block diagram. **(10 Marks)**

b. Define addressing modes of 8086 and identify the addressing modes of the following instructions: i) add ax, [si] ii) mov al, [1000] iii) mov [bx + si + 06], bl iv) mov bx, [bp + 50] **(10 Marks)**

2 a. Discuss the functions of following instructions:
i) xlat ii) aam iii) das iv) imul bx
v) lds bx, [1234h] **(10 Marks)**

b. Write an ALP to multiply two-16 bit packed BCD numbers. **(06 Marks)**

c. Define the following assembler directives:
i) ALIGN ii) EVEN iii) ENDS iv) LOCAL **(04 Marks)**

3 a. Describe the following string instructions :
i) repe movsb ii) cmpsb iii) scasb iv) lodsb **(08 Marks)**

b. Write an ALP to scan for a character in a string and replace by another character. Use assembler directives. **(08 Marks)**

c. Write a program to convert binary byte to ASCII equivalent. **(04 Marks)**

4 a. Define an interrupt. Explain 8086 interupts and response mechanism. **(08 Marks)**

b. Write a macro for the following cases:
i) Read a character from keyboard without echo.
ii) Display a message on the CRT monitor.
iii) Display an integer on CRT monitor. **(06 Marks)**

c. Write a subroutine to print a string on printer. Call this subroutine from a main program to print two message strings. **(06 Marks)**

PART – B

5 a. Interface 4×4 keyboard to 8086 microprocessor using 8255 PPI. Write the necessary circuit diagram and program. **(10 Marks)**

b. Write an ALP to interface seven segment display to 8086 and demonstrate the display as flashing display. Write the necessary circuit diagram. **(10 Marks)**

6 a. Write the control word format of 8087 and define various fields. **(04 Marks)**

b. What are the functions of following 8087 instructions? Explain.
(i) FENI (ii) FCOMP (iii) FSTENV (iv) FLDL2E
(v) FLDZ **(10 Marks)**

c. Write 8087 ALP to compute the volume of the sphere. **(06 Marks)**

7 a. With a neat block diagram, explain the maximum mode operation of 8086. **(10 Marks)**

b. What are the characteristics of PCI and USB interface? **(06 Marks)**

c. Show an interface of printer to a 8086 microprocessor. Define the signals of importance. **(04 Marks)**

8 Write short notes for the following:

a. Pentium microprocessor. **(08 Marks)**

b. Special registers of 80386. **(06 Marks)**

c. Memory structure of 80386. **(06 Marks)**

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PART – A

1 a. With a neat diagram, explain the BIU of the 8086 microprocessor. **(08 Marks)**

b. Explain memory segmentation and advantages of using segment registers. **(06 Marks)**

c. Indicate the addressing modes of the destinations operand and calculate its physical address for the following instructions
   i) MOV wordptr [BX + DI + 3456H], 8ACDH
   ii) ADC [BP + 200H], AX
   Assume DS =4567H, SS = 4000H, BX = 5678H, DI = CDEFH, BP = 69BOH, SP = 64AOH. **(06 Marks)**

2 a. Explain the following machine control instructions :
   i) ESC ii) LOCK prefix iii) WAIT. **(06 Marks)**

b. Explain the following directives :
   i) ALIGN ii) ASSUME iii) EXTERN iv) SHORT v) OFFSET. **(10 Marks)**

c. Write a program sequence that will reverse the contents of the 4 bytes LIST through LIST+3. **(04 Marks)**

3 a. Explain the following string instructions:
   i) SCASB ii) LODSW iii) CMPSB iv) STOSW **(04 Marks)**

b. Write an ALP to convert an ASCII coded decimal number to its binary equivalent. **(10 Marks)**

c. Develop an 8086 ALP to compute ' n_{C_r} ' using recursive procedure. Assume 'n' and 'r' to be positive integers (n and r < = 8) and place the result in a memory word location. **(06 Marks)**

4 a. Discuss briefly the types of interrupts in 8086. **(10 Marks)**

b. Write an interrupt service procedure to read characters from an ASCII keyboard on interrupt basic. **(10 Marks)**

PART – B

5 a. Interface 3×4 keyboard to 8086 microprocessor using 8255. Write an ALP with the necessary circuit diagram. **(10 Marks)**

b. Discuss briefly the modes of operations of 8255 and the control word format. **(10 Marks)**

6 a. Draw and explain the bit pattern of control register 8087. **(07 Marks)**

b. Convert -29.563 to long real form. **(03 Marks)**

c. Write an ALP to find mean and standard deviation using 8087 instructions. **(10 Marks)**

7 a. Bring out the differences between minimum mode and maximum mode of 8086. **(04 Marks)**

b. Explain the write cycle timing diagram for minimum mode. **(06 Marks)**

c. Describe briefly the USB and also give the flowchart used to generate USB data. **(10 Marks)**

8 a. Explain the following with respect to Pentium processor :
   i) Branch prediction logic ii) Cache structure iii) Super scalar architecture. **(10 Marks)**

b. Write a short note on :
   i) Special registers of 80386 processor ii) Salient features of 80486 processor. **(10 Marks)**

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Sixth Semester B.E. Degree Examination, June/July 2013

Microprocessors

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Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With a neat diagram, explain the CPU architecture of 8086. **(08 Marks)**

b. Define any four addressing modes used in 8086 microprocessor. Identify addressing modes used in each of the following 8086 instructions:
   i) MOV BX, 0354H
   ii) ADD AL, [BX + 04]
   iii) MOV AX, [BX + SI]
   iv) MOV AX, [BX + SI + 04] **(08 Marks)**

c. If DS = AB40H, CS = 9960H, SS = 3B00H, BP = 7E74H, SP = 0135H, SI = 1245H, DI = 4356H, then determine physical address of the following instructions:
   i) MOV [BP + DI + 6], AH
   ii) ADD AL, [5036H] **(04 Marks)**

2 a. What do you mean by segment override prefix? Give an example. **(04 Marks)**

b. Explain the role of AAD and AAM instruction of 8086 microprocessor with an example. **(06 Marks)**

c. Write an assembly level language program to sort the numbers in ascending order using Bubble sorting technique. The program should be written using assembler Directives. **(10 Marks)**

3 a. What are Assembler Directives? Explain the following directives with an example for each:
   i) ASSUME
   ii) PUBLIC and EXTRN
   iii) GLOBAL
   iv) ALIGN16 **(09 Marks)**

b. Write an ALP to search a given character in the array of characters using string instructions. What is the role of SI, DI registers and DF bit? **(05 Marks)**

c. Write an ALP to read a string from the keyboard and display the reversed string on the monitor screen. **(06 Marks)**

4 a. Define interrupts. Explain TYPE0, TYPE1, TYPE2, TYPE3 and TYPE4 interrupts. **(06 Marks)**

b. Explain hardware interrupts of 8086 microprocessor. **(04 Marks)**

c. Differentiate macros and procedures. **(04 Marks)**

d. Write a macro to read a character without echo and to read a string of characters from the keyboard. **(06 Marks)**

PART – B

5 a. Define Stepper motor. Explain the interfacing of a stepper motor to 8086 microprocessor with necessary circuit diagram. Write an ALP to rotate the stepper motor clockwise by n steps and anticlockwise by m steps. **(10 Marks)**

b. Interface 4 × 4 keyboard to 8086 microprocessor using 8255. Write the necessary circuit diagram and an ALP. **(10 Marks)**

6 a. What are the functions of following 8087 instructions? Explain.
   i) FCOMP
   ii) FENI
   iii) FDECSTP
   iv) FSTENV
   v) FYL2XP1 **(10 Marks)**

   b. Write a program using 8087 instructions to compute the volume of the sphere using MASM syntax. **(06 Marks)**

   c. Explain the control register format of 8087. **(04 Marks)**

7 a. With a neat diagram, explain the maximum mode operation of 8086. **(08 Marks)**

   b. What are the characteristics of PCI and USB interface? **(06 Marks)**

   c. Interface Printer 8086 processor with relevant signals of importance. Explain using a flowchart. **(06 Marks)**

8 Write short notes for the following:

   a. 80386 special registers **(06 Marks)**

   b. Salient features of 80486 processor **(06 Marks)**

   c. Pentium CPU architecture **(08 Marks)**

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