Question Paper

Exam Date & Time: 25-May-2022 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
IV SEMESTER B.Sc.(Applied Sciences) in Engg.
END SEMESTER THEORY EXAMINATION-MAY/JUNE 2022

MICROPROCESSORS [ICS 241 - S2]

Marks: 50 **Duration: 180 mins.**

Answer all the questions.

Missing data may be suitable assumed.

1)		Draw the internal architecture of 8086. Explain Execution unit of 8086 in detail.	(5)
	A)		
	B)	Assume the contents of various segment registers and index registers in hexadecimal is as follows. CS: IP = 348A:1211, SS:BP=2146:1BCA, DS:SI= 3800:1234, DS:DI= 3800:1546 and DS:BX=3800:1856. Write the addressing mode for the source operand and calculate the effective address and physical address in hexadecimal for the byte/word read in each of the following instructions given below. i) ADD CX,32H[BX+SI] ii) CMP CX,[BP+12+DI]	(3)
	C)	Explain the following assembler directives with an example i) EQU ii) OFFSET	(2)
2)		Write an 8086 assembly language program to remove all duplicate characters except space from a sentence present in the memory. Store the result as a new string in the memory. Example: input = Manipal Institute, result = Manipl Istue.	(5)
	A)		
	B)	Write a single 8086 instruction for each of the following operations. Assume that the values will change in the specified bit positions only and values in the rest of the bit positions will remain the same for each operation. Assume each operation is independent of the others. i) Sets the rightmost four bits of AX; ii) Clears the leftmost three bits of AX; iii) Inverts bits 7, 8, and 9 of AX.	(3)
	C)	Explain the following string instructions along with syntax. i) SCASB ii) LODSW	(2)

3) A) Write an 8086 assembly language program that uses a procedure to combine two strings as given below. Get the two given input strings from the console, pass them as parameters to the procedure and display the resultant string in the console. Assume the two words in the resultant string are separated by a single space. (5)

String1: Good Morning String2:Best Tactics
Resultant String : GBoeosdt MToarcntiincgs

B) Assuming the clock frequency of 8086 as 8MHZ, calculate the value of "N" in the below program to generate a delay of 500µsec. Show all the calculations required. (3)

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                    Clock Cycles
MOV CX, N       ; 4
NOP             ; 3
DO: NOP         ; 3
    NOP         ; 3
LOOP DO         ; 17 or 5
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C) Explain the purpose of various registers in 8259A. (2)

4) A) Explain the single handshake data transfer method in Programmable Peripheral Interface 8255 with a suitable waveform. How is an 8255A configured if its control register contains 9Bh? (4)

B) Write how an 80286 is switched from real address mode to protected virtual address mode and how it is switched back to real address mode operation. Show the computations which tell how much physical memory and virtual memory an 80286 can address. (3)

C) With necessary diagram, explain how an 80386 computes physical address when paging mode is enabled. (3)

5) A) Compare and contrast the memory system in Pentium and Pentium Pro microprocessors. Explain the role of the functional units given below in Pentium Pro. i) Instruction Fetch and Decode Unit ii) Dispatch and Execution Unit iii) Retire Unit (5)

B) Suppose a double word data is to be stored at an address 00000050H in a Pentium processor, identify the bank enable signals that needs to be activated. Justify your answer. Also define hyper threading in Pentium4 and Core 2 processor. State the case in which a hyper threaded Pentium 4 processor runs slower when compared to a dual processor system. (3)

C) Discuss the following signals of 80486: (2)

a) $\overline{BS16}$ b) $\overline{IGNNE}$ c) $\overline{FLUSH}$ d) $\overline{KEN}$

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