INTERNATIONAL CENTRE FOR APPLIED SCIENCES
MAHE, MANIPAL
B.Sc. (Applied Sciences) in Engg.
End – Semester Theory Examinations – May 2021
IV SEMESTER: MICROPROCESSORS (ICS 241)
(BRANCH: CSE)

Time: 3 Hours **Date: 12 May 2021** **Max. Marks: 50**

- ✓ **Answer ALL Questions.**
- ✓ **Missing data, if any, may be suitably assume.**

1A. State the purpose of control flags in 8086 and explain the various control flags. How does it differ from conditional flags? **(3)**

1B. Identify the 8086 addressing mode and calculate the physical address of the source operand in the following instructions. Assume the values in the registers DS, CS, BX and SI are 9999H, 8888H, 7777H and 6666H respectively. Solve each instruction independently and all answers must be provided in hexadecimal. **(3)**

i) ADD AL, 50H[BX]
ii) MOV CL, [BX][SI]
iii) SBB DL, 50H[BX][SI]

1C. Explain the following assembler directives with an example **(4)**
i) EQU ii) LABEL iii) OFFSET iv) ASSUME

2A. Write a complete 8086 assembly language program to perform the following and store the result in a memory location. **(4)**
1! + 2! + 3! + 4! + 5!

2B. Write down the corresponding 8086 instruction to perform each of the following independent operations. **(4)**

i) OR the value 22H with the data addressed by BP,
ii) Invert only the bits in positions 7, 8, and 9 of AX .
iii) Extract the upper nibble in BX and save the result in BX.
iv) XOR the data stored 40 bytes after the location addressed by BP with AL and save the result in AL.

2C. Explain the following string instructions with examples **(2)**
i) REPE SCASB ii) LODSB

3A. Write an 8086 assembly language program to perform the following: **(5)**
Accept two strings of equal length from the keyboard. The program has to check for matching of characters in the same index in both the input strings and this character wise checking has to be repeated for the entire length of the string. If there is a match, replace that character in the second string by the next character

in the first string with wrapping around at the last character. Else, retain the character in the corresponding index in the second string. Display the output string
Example: Input string1: HELLO Input string2: HULOO Output string: EULOH

3B. Describe the steps taken by an 8259A to send the interrupt type to 8086 if it receives an interrupt signal on its IR5 input. Assume IR3 and IR5 are enabled in Interrupt Mask Register, fixed priority is used for the IR inputs and IR5 is the first interrupt request to the 8259A device. Also explain with a suitable diagram, the response the 8259A will make if it is servicing the initial IR5 interrupt and an IR3 interrupt signal occurs. Assume INTR pin is enabled at the beginning of IR5 service procedure. **(5)**

4A. Explain the double handshake data transfer method in Programmable Peripheral Interface 8255 with a suitable waveform. Also explain the operation performed by 8255 if RD' = 0, WR' = 1, CS' = 0, A0 = 0 and A1 = 1. Your explanation must also include the possible control word required to configure the ports of 8255 to perform this operation. **(5)**

4B. Assume 80286 has to run three programs P1,P3 and P2 in sequence after a system reset. The programs P1 and P2 are to be executed in real mode and P3 to be executed
in protected mode. Explain how CPU switches between the modes to complete the execution of programs in given order. Also show the computations which tell how much physical memory and virtual memory an 80286 can address. **(5)**

5A. With the help of a neat diagram explain the pipeline stages for integer operation in a
Pentium processor. **(4)**

5B. Explain the following features of Pentium4 and Core 2. **(4)**
i) Hyper-threading technology ii) 64-bit extension technology

5C. Discuss the functionality of any four signals of bus cycle definition signal group in 80486 processor. **(2)**

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