Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

END SEMESTER EXAMINATIONS, APRIL / MAY 2019

COMPUTER ORGANISATION AND MICROPROCESSOR SYSTEMS [ICT 2202]

REVISED CREDIT SYSTEM

(26/04/2019)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data, if any, may be suitably assumed.

1A. Write the flow chart for Nonrestoring division algorithm. Perform division of $(12)_{10}$ by $(4)_{10}$ using the same, indicating all the steps. **5**

1B. Write any two differences between procedure and macro. Write an Assembly Language program to find the factorial of a number (less than or equal to 8) using a recursive procedure. **3**

1C. Explain the following assembler directives: **2**
i. PTR ii. ENDP iii. DQ iv. DUP

2A. Explain the following instructions of 8086 with an example for each. Also, write the effect of these instructions on flag register. **5**
i. AAA ii. RCL iii. SBB iv. XLAT v. LOOPNZ

2B. Design a 4-bit ALU, according to the truth table given below. **3**

Control inputs		Operation
S_1	S_0	
0	0	X plus Y
0	1	X plus 2
1	0	X OR Y
1	1	X NAND Y

2C. Explain block transfer DMA technique with the help of a neat diagram. **2**

3A. Design a microprogrammed control unit for 4x4 Booth's multiplier. **5**

3B. Explain the function of the following pins of 8086: **3**
i. HOLD and HLDA ii. NMI and INTR

3C. In 8086, accessing a word from ODD addressed memory location takes more time than accessing a word from EVEN addressed memory location. State TRUE/FALSE. Justify **2**

4A. Explain the internal architecture of 8086 with the help of a neat diagram. **5**

4B. Assume that a 4 x 8 matrix keyboard is interfaced to 8086 using a programmable peripheral interface 8255 working in mode 0. Write an 8086 procedure that detects a key press and returns the keycode in the register BL. **3**

4C. The parameters of a computer memory system are specified as follows: **2**
Main memory size = 32K blocks
Cache memory size = 1024 blocks
Block size = 32 words
Determine the size of the tag field of the main memory address for the following mapping techniques:
a. Fully associative mapping
b. Direct mapping

5A. Explain the string instructions: LODSB and SCASB. Using the same, write an assembly language program to count the number of consonants in a string. String is input from keyboard and consists of numbers, alphabets and arithmetic operators. Store the count in the data segment. **5**

5B. Explain the different modes of 8254. **3**

5C. Draw the circuit to add three, 3 – bit signed numbers using Carry Save Adder. **2**