Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

FOURTH SEMESTER B.TECH (E & C) DEGREE END SEMESTER EXAMINATION
MAY/JUNE 2016
SUBJECT: MICROPROCESSOR AND MICROCONTROLLER (ECE - 204)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates
- Answer any **FIVE FULL** questions.
- Missing data may be suitably assumed.

1A. Describe the functions of the following registers in 8086 processor.
i) Segment registers ii) General purpose registers.

1B. Identify the addressing mode and calculate the physical address, if DS=2100h, CS = 3050h, ES= 5070h, SS= 4060h, BX=1020h, BP= 1000h, DI=1B00h.
(i) MOV AX, [BX+20h] (ii) MOV AX, [BP+20h]
(iii) MOV AX, [BX+DI+100h]

1C. Explain any two methods of passing parameters to procedure with relevant example.

(5+3+2)

2A. Design an 8086 based system in minimum mode for the following specification:
i) 64 KB EPROM with starting address F0000H
ii) 64 KB RAM with starting address 30000H
Draw the complete schematic of the design with address map.

2B. Why it is desirable to have the program or data aligned at even address in 8086 ? Illustrate with suitable diagram.

2C. Differentiate between macro and procedure with one example.

(5+3+2)

3A. Write an assembly language program to compute the average of 16 bit numbers available in an array starting from a location called ARRAY. The length of the array is available in a location called COUNT. Store the result in consecutive locations called RESULT.

3B. Explain in detail how 8086 responds to an interrupt.

3C. With a neat timing diagram, explain the memory read cycle in minimum mode.

(5+3+2)

4A. Discuss all the addressing modes available in 8051 with suitable examples.

4B. Describe the function of following 8051 pins: i) RESET ii) $\overline{PSEN}$ iii) ALE

4C. Explain the range of branching in 8051 for the following instructions: i) JNZ and ii) AJMP

(5+3+2)

5A. Draw the interface diagram to connect an ADC to 8086. Write a program to read the digital equivalent of analog input and store it in the memory location DS:5000H. Assume that the port addresses are 8900H - 8903H.

5B. Describe the control word format of 8254. Show how to program 8254 as a square wave generator using counter1. Assume the count is less than FFH.

5C. Explain the function of following pins of 8251: i) T_xRDY ii) $C/\overline{D}$

(5+3+2)

6A. Write an 8051 interrupt program to do the following:

i) Transmit the message "Hello" using serial port at 9600 baud rate

ii) Generate the square wave of frequency 8 KHz on P0.4

iii) Send 0x55 and 0xAA alternatively to Port 1, when the $\overline{INT0}$ interrupt occurs.

Assume that the crystal frequency is 11.0592 MHz.

6B. Draw an interface diagram to connect stepper motor to 8051 microcontroller. Write an ALP to rotate the stepper motor 10 steps in clockwise and 10 step anticlockwise direction continuously.

6C. Explain the function of each bit in TCON register.

(5+3+2)