Reg. No.										

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

IV SEMESTER B.S. DEGREE EXAMINATION

SUBJECT: MICROPROCESSOR SYSTEMS (EC 242)

(BRANCH: E&C / E&E)

Thursday, 4 May 2017

Time: 3 Hours **Max. Marks: 100**

- ✓ **Answer ANY FIVE full questions.**
- ✓ **Missing data may be suitably assumed.**
- ✓ **Write comments or explain the logic for all the programming questions.**

1A. Explain the programming model of 8086 microprocessor.

1B. With proper syntax and illustration, explain the following instructions of 8051. Write the addressing mode/s supported by of each of these instructions.

i) CJNE ii) DA A iii) XCH

1C. Identify the addressing mode and calculate the physical address that is accessed in each of the following instruction, if DS = 2100H, CS = 8A00H, SS = 4800H, BX = 1100H, SI = A000H, DI = BA00H.

i) MOV AX, [BX+20H]
ii) MOV BX, [BP + 45H]

(10+6+4)

2A. Explain the functions of the following 8086 pins. Mention if the pins are IN/OUT or Bi-directional signals.

a) $\overline{INTA}$ b) READY c) ALE d) $\overline{DEN}$

2B. Identify the addressing mode used in each of the following instruction of 8051 and explain the function of each instruction.

(i) MOV A, #45
(ii) MOVC A, @A+DPTR
(iii) SWAP A
(iv) MOV 2, 3
(v) PUSH 0E0H
(vi) MOV 40H, #25H

(8+12)

3A. Explain the following data definition directives showing memory sketches, with examples for each.

a) DB b) DW

3B. Explain the following pseudo-instructions with examples for each.

a) PTR b) EQU

3C. Write a program for 8086 to add two 4-digit BCD numbers and store the result in memory. Assume the two BCD numbers are also in memory. Write comments explaining the logic for the program.

(6+4+10)

4A. Write down the steps for programming the timer of 8051 in mode-1. Write a program to send two digit decimal down count with a delay of 0.5 seconds on port-1. Use timer-0 in mode-1 to generate delay (crystal frequency= 11.0592MHz).

4B. With a neat diagram, explain the internal block diagram of 8255.

(10+10)

5A.Write a program for 8086 to add two 8-digit BCD number stored in memory and store the result in memory. Use the data segment definition as given below.

```
.data

    x DB 12H, 87H, 34H, 75H        ; x = 12873475
    y DB 48H, 98H, 06H, 90H        ; y = 48980690
    z DB 0,0,0,0,0
```

5B. Write a program for 8086 to sort an array of 8 bit unsigned numbers using selection sort. Write a subroutine to find the maximum of the array and use this subroutine in the sorting program. Write comments or explain the logic for the program.

(10+10)

6A. With neat simplified timing diagrams, briefly explain the memory read and I/O write bus cycles for the minimum mode operation of 8086.

6B. Explain briefly the steps taken by 8086 in response to an interrupt. Explain the interrupt vector table of 8086.

(10+10)

7A. With neat diagram, explain the pin structure of port-1 of 8051. Explain the steps for reading from the 'port pin' input of port-1.

7B. With a neat internal block diagram, explain the architecture of 8051.

(10 + 10)

8A. Explain the following addressing modes of 8086 with examples for each mode.

a) Immediate
b) Direct
c) Register
d) Indirect
e) indexed

8B. Explain the data memory and code memory architecture of 8051 with neat diagrams.

8C. Explain the interrupt organization of 8051. Write the IVT and IE register for 8051.

(10+5+5)