B.E. Comp. Sc. & Engg. 2nd Year, 2nd Semester Examination 2017 (Old)
MICROPROCESSORS

Time : Three Hours | Full Marks : 100

Answer any *five* questions

All parts of a question are to be answered together

1. Design an 8085 based micro-computer in block level with the following specifications.(Exact pin level details are not required but all important signals required for interfacing are to be clearly indicated).

   CPU 8085
   ROM 4K (from 0000_H to $0FFF_H$)
   RAM 6K (from 2000_H to $37FF_H$)
   One 8279 with 32 keys and 8 displays (40_H and 41_H)
   One 8255 (38_H to $3B_H$)
   One 8253 (48_H to $4B_H$)

   (20)

2a. After execution of the following program the contents of memory locations 2000_H and 2001_H were 28_H and 01_H respectively. What were the initial contents of 2000_H and 2001_H?

```
LHLD  2000        RRC           YY: DCR  D
MOV   A L         RRC               JNZ  :XX
ANI   0F          MOV  D A          ADD  C
MOV   C A         XRA  A            DAA
MOV   A L      XX: ADI  16          MOV  L A
ANI   F0          DAA               JNC  :PP
RRC               JNC  :YY          INR  H
RRC               INR  H         PP: SHLD 2000
```

b. Write the program segment to configure the counters in 8253 as indicated below : Assume that address of counter 0 be 60_H .

   (i) Counter 0 : Mode 2, counting in decimal, load 16 bit value
   (ii) Counter 1: Mode 0, counting in hexadecimal, load 8bit value for LSB
   (iii) Counter 2: Mode 4, counting in decimal, load 16 bit value

c. Explain the Read-on-fly operation and its application. Describe its implementation in 8253. (10+5+5)

3a. Suggest a setup to input bytes of data for 8085 using 8279. Provide necessary block diagram for the hardware arrangement and also the necessary assembly language program.

b. Assume that CALL $2A00_H$ instruction is stored at memory location $2A00_H$ and the content of SP is $2A01_H$. Explain the sequences of events that take place when this CALL instruction is executed. (10+10)

4a. An 8253 is to be interfaced with an 8085 CPU with I/O addresses 30_H to 33_H and accordingly to write a subroutine to generate continuous pulse train of On time 1.25 Secs. And OFF time 2 Secs. The system has a crystal controlled clock of 1.5 MHz. Show precisely the count and mode words to be loaded in respective counters. (Neglect the time required by CPU foe execution).

b. There are N bytes stored from memory location 2000_H. The value of N is stored in 1000_H. Write an 8085 program (with comments) to find the sum of bytes whose D_4D_3= 1 1. Store the result in 3000_H and 3001_H

(10+10)

5a. Propose a schematic diagram to interface an 8-bit printer with 8085 using 8255 PPI. Also give the driver program for your proposed interface.(Give sufficient comments for clear understanding)

b. Write an assembly language program to count the number of occurrences of BCD zero (four consecutive zeroes either in lower nibble or in upper nibble) in memory locations 2041_H through $204A_H$. Store the count in decimal in memory location 2040_H. (10+10)

6a. Identify the function performed by the following 8085 program .

```
LXI D 0000H      XX: IN Port A      JP :XX
XCHG                 DCX H          SPHL
DAD SP               MOV M A        HLT
MVI C 04H            DCR C
```

b. Fibonacci sequence is defined as : $F(i) = F(i-1) + F(i-2)$ for all $I > 2$ with $F(1) = F(2) = 1$
Write an assembly language program to generate first 10 elements of the sequence and store them in consecutive memory locations. (10+10)

7. Write an assembly language program to reverse the order of bits in register pair D E of 8085 microprocessor. (20)