1- Calculate the value of an 8-bit Accumulator (A) in hexadecimal number system at the end of logical and arithmetic operations listed below.

a)

```
            MOV    A,#0D      ; A=(0)₁₀
            MOV    R0,#99D  ; R0=(99)₁₀
    LOOP:   ADD    A,R0
            DJNZ   R0,LOOP
```

            ;A=(?)$_{16}$

b)

```
            MOV    A,#0CCH    ; A=(CC)₁₆
            ANL    A,#0FH
            ORL    A,#40H
            XRL    A,#0F0H
```

          ; A=(?)$_{16}$

c)

```
            MOV    20H,#10D    ;  [20H]=(10)₁₀
            MOV    R0,1FH
            ORL    20H,#03H
            INC    R0
            MOV    A,@R0
```

         ; A=(?)$_{16}$

2- An 8 bit CPU having 64KBytes addressing capability will be connected to a memory block containing 1 piece of 27C64 EPROM, 1 piece of 62C128 static RAM, 1 piece of 28C64 EEPROM , 2 pieces of 74HC573 (8 bits single directional latch) and an address decoder unit. A 48-key keypad will be used for manual operations. A relay and an LED will be driven through two of the outputs of the 74HC573. LED will directly be sunk by an output pin of 74HC573 via a resistor. Relay will be driven through an NPN transistor. Reset vector assigns ProgramCounter=0000H.

a) Draw the memory-addressing map of the described system and related logical chip selection table for the decoder.

b) Draw the circuit schema of the system using 74HC138 as the decoder IC. (Value of the components may not be calculated)

c) Components' electrical parameters are given as,
LED : I_{AC}=5mA, V_{AC}=1.2V
NPN transistor : hFE=400, V_{BE}=0.7, V_{CEsat}=0.2V
Relay : $I_R \cong$ 100mA @ 5V

Calculate required resistor values for driving LED and the relay.

Duration : 100minutes 1- a)15P b)10P c)10P   2-a)15P b)30 c)20P