

Question 1:

Design a circuit diagram for the following comparator system that takes three 3-bit binary numbers [A and B] as inputs and outputs in the following fashion:

Output=1; if $A < B$

Output=0; otherwise

NB: For the comparator part, you should only use different gates to build the circuit. You cannot use a COMPARATOR IC for building that part. For other parts, you may use corresponding ICs.

Question 2:

Design a 18 person voter system using necessary parallel adder(s) only. Use a minimum number of components in your circuit.

Question 3:

Design a BCD to excess 5 system using necessary parallel adder(s).

Question 4:

Build a circuit that implements the 1's complement number system (4 bits) using encoder and decoder.

Question 5:

Implement the following boolean function using **a)** 16:1 mux **b)** 8:1 mux **c)** 2:1 mux **d)** 4:16 decoder **e)** 3:8 decoders **f)** 2:4 decoders

$F(A,B,C,D) = \sum(0,1,2,7,8,10,11,13, 15)$

Make sure that your circuit is efficient, meaning you should use the lowest number of components.