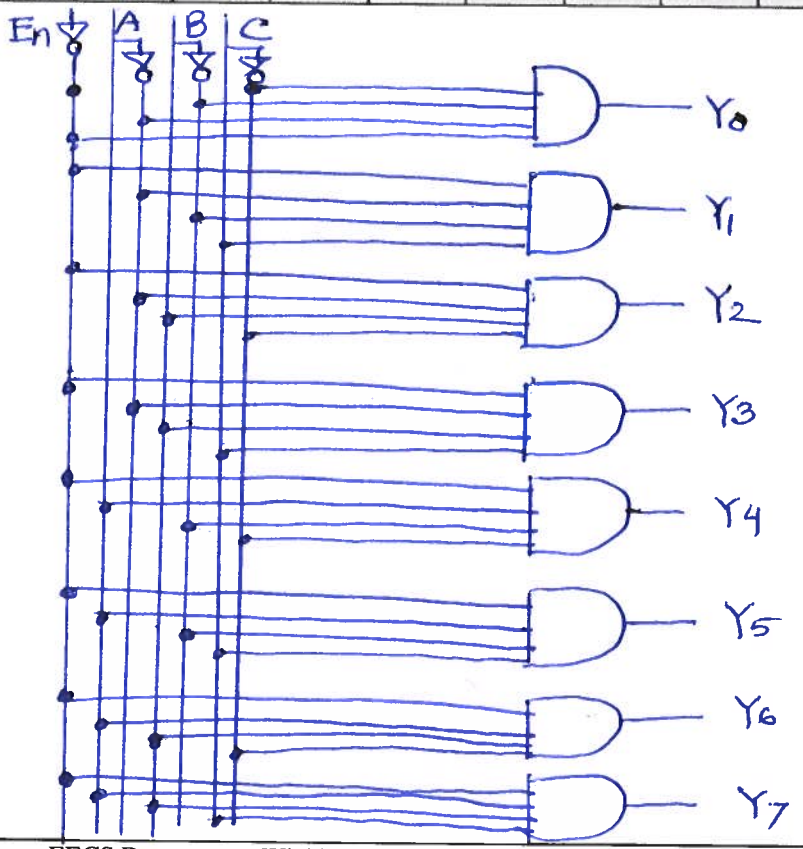
You are expected to solve homework problems individually. If needed, you may seek help from your friends. However, do not copy. Show all steps with your solutions for full credit.

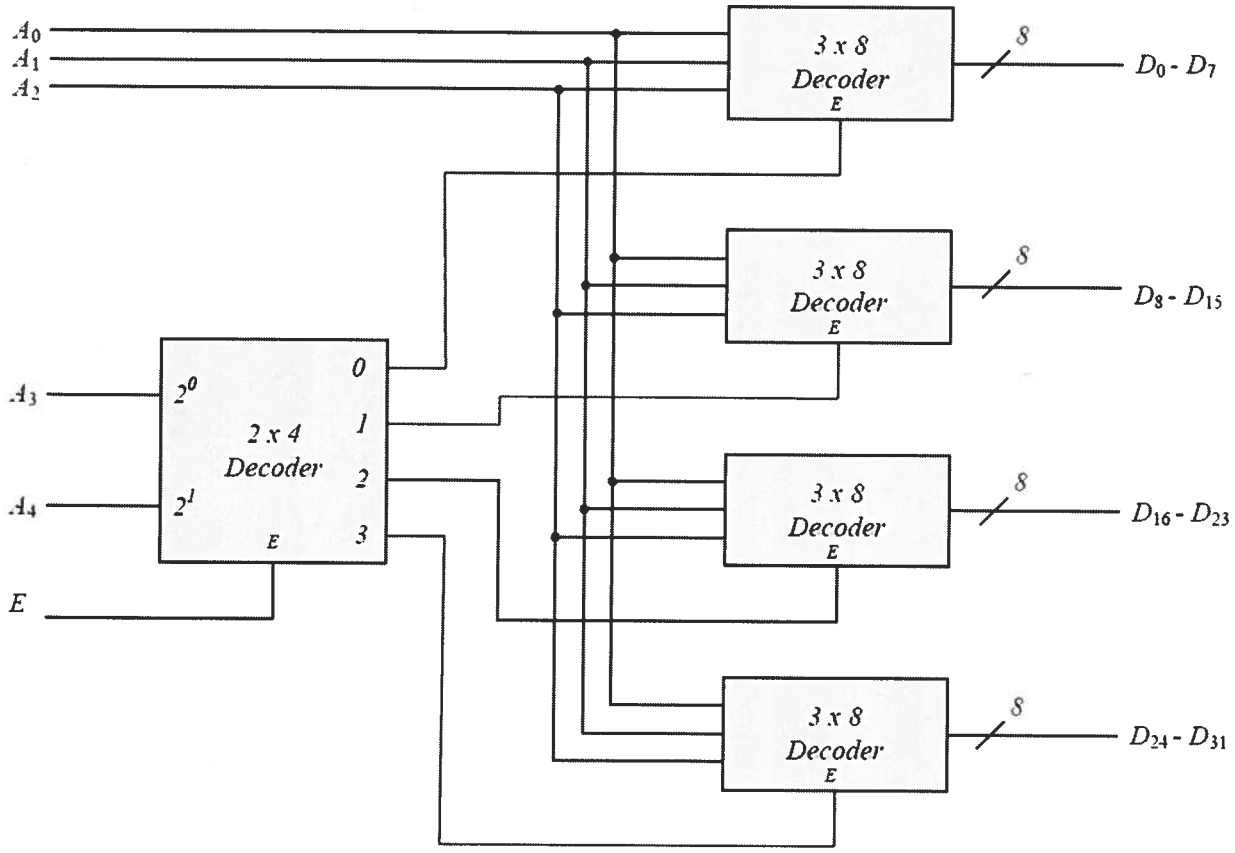
Name: KEY **/ 50**

1. (15 points) Write the truth table and draw the logic diagram of a 3-to-8-line decoder with active low enable input.

Inputs				Outputs							
$\overline{EN}$	A	B	C	Y_7	Y_6	Y_5	Y_4	Y_3	Y_2	Y_1	Y_0
1	×	×	×	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	1	0	0	0	0	0	0	1	0
0	0	1	0	0	0	0	0	0	1	0	0
0	0	1	1	0	0	0	0	1	0	0	0
0	1	0	0	0	0	0	1	0	0	0	0
0	1	0	1	0	0	1	0	0	0	0	0
0	1	1	0	0	1	0	0	0	0	0	0
0	1	1	1	1	0	0	0	0	0	0	0

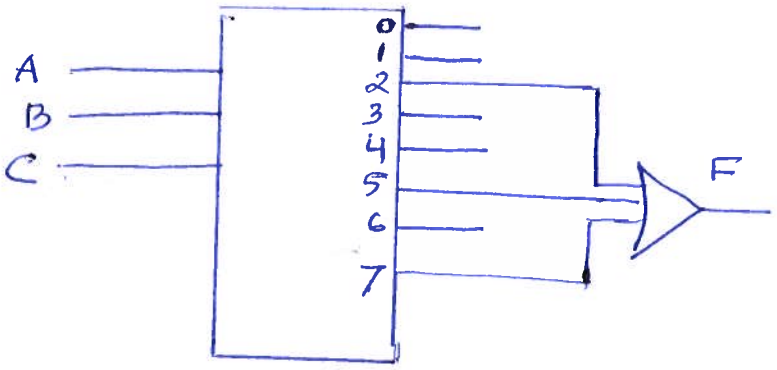


2. (20 points) Construct a 5-to-32-line decoder with four 3-to-8-line decoders with enable and a 2-to-4 line decoder. Use block diagrams for the components.

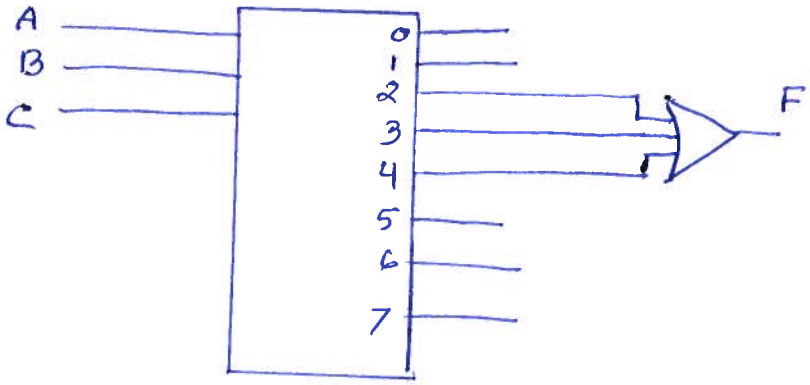


3. (15 points) A combinational circuit is specified by the following three Boolean functions. Using a decoder and external gates, design the combinational circuit.

   a. $F1(A, B, C) = \sum(2,5,7)$



   b. $F2(A, B, C) = \sum(2,3,4)$



   c. $F3(A, B, C) = \sum(0, 6, 7)$