1- An ABCD-to-seven-segment decoder is a combinational circuit that converts a decimal digit in BCD to an appropriate code for the selection of segments in an indicator used to display the decimal digit in a familiar form. The seven outputs of the decoder (a, b, c, d, e, f, g) select the corresponding segments in the display, as shown in fig. a. The numeric display chosen to represent the decimal digit is shown in fig. B. Represent K-Maps, write the simplified canonical representation.
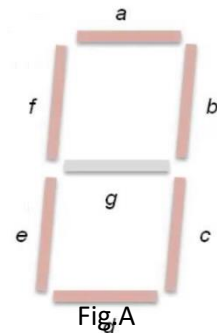

Fig.A

Fig.B

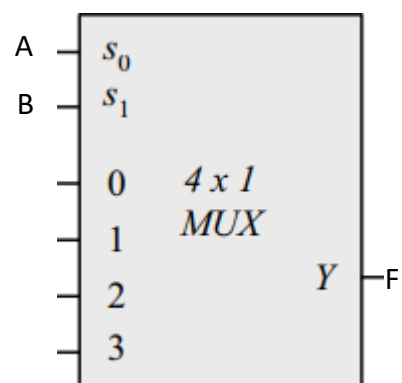2- Design the combinational circuit using **decoder** and **two-input NAND** gates.

   (a) **F(A, B, C)= A B´C + AB´ + AC**
   (b) **F(A, B, C) = (A´ + B + C´)(A´ + B)(A´ + C)**

3- A-) Implement the Boolean function (**F**) with a **4 X 1** multiplexer and two-input-NOR gates. Connect inputs A and B to the selection lines. The input requirement for the four data lines will be a function of variables C and D. These values are obtained by expressing F as a function of C and D for each of the four cases when AB = 00, 01 ,10 and 11.

B-) Implement the Boolean function with a **8 X 1** multiplexer. Connect inputs A,B and C to selection lines.

F(A, B, C, D) = $\sum$ (1, 3, 5, 9, 10, 14, 15)

Deadline: 05.04.2022

     23.59