Note: 10 mark for all question

Q1/ Draw 4-bit parallel adder find the sum and output carry for the addition of the following input carry $c_{n-1} = 1$.
$A_4A_3A_2A_1 = 1101$ and $B_4B_3B_2B_1 = 1001$

Q2/ Implement a full adder with a decoder and two or Gates
$S(x,y,z) = \Sigma(1,2,4,7)$
$C(x,y,z) = \Sigma(3,5,6,7)$
3-to-8 line decoder

Q3/ Design 1-to-8 Demultiplexer

Q4/ What is the type of shift Register, and Design shift register 4-bit.

Q5/
1. Use K-map to simplify the following expression:
   $F(A,B,C,D) = \Sigma 0,3,4,7,8$ without don't care
   $F(A,B,C,D) = \Sigma 1,2,13,14,10,11$ with don't care
2. Simplify the following Boolean expression with drawing before and after simplified.
   $AB + A(B+C) + B(B+C)$

Q6/ Answer all question below
1- Convert Decimal to Hexadecimal (650).
2- Convert BCD number to Gray (0100).
3- Addition Hexadecimal (3BC) + (428).
4- find the 1's and 2's complement of binary number (10110010)
5- Subtract Octal number (45) + (14).