



Question 1:

- a) Determine the largest number among the following numbers

$$(1001\ 0011\ 0101)_{\text{BCD}}, \quad (1647)_8, \quad (3A7)_{\text{H}}$$

- b) Perform the following operations using signed 7-bit binary numbers and detect if there is any overflow or underflow cases

$$20 + 52 = ?$$

$$35 - 46 = ?$$

$$-18 - 50 = ?$$

Question 2:

- a) Simplify the following logic function using Boolean Algebra and draw the final circuit using only 2 inputs logic gates

$$F(A, B, C, D) = A\bar{B}\bar{C}D + AB(\bar{C} + D) + A(BC + CD)$$

- b) Simplify the following function using K-map and draw the final circuit using a minimum number of gates

$$F(X, Y, Z, W) = \sum(0, 2, 5, 7, 8, 10, 12, 14)$$