



Questions	Mark
Q1(%25)	
Q2(%25)	
Q3(%25)	
Q4(%25)	
Total	

Name: .....  
 Student's Number:.....

Q1) Implement the following Boolean function together with don't care conditions  $d$ , using no more than three **NOR** gates:

$$F(A, B, C, D) = \sum (0, 1, 9, 11) + \sum d(2, 8, 10, 14, 15)$$

Q2) (a) construct a truth table for the following function:

$$F(a, b, c) = \overline{(ab + \bar{a}c)} + bc$$

(b) Use the truth table of (a) to write the function F in sum of minterms form.

(c) Expand the function  $F(x, y, z) = y + \bar{x}z$  to product of Maxterms form.

(d) Simplify the following function using K-Map.

$$F(w, x, y, z) = \bar{w}z + xz + \bar{x}y + w\bar{x}z$$

Q3) Implement a 3-input XOR gate using only 4x1 multiplexer and an inverter. Sketch and complete a truth table with the correct labels and function solution.

Q4) Given the state diagram below, generate the state table and design a sequential circuit using D flip-flop.

