

## COMPUTER ENGINEERING DEPARTMENT

### COE-202 – Fundamentals of Computer Engineering (section 02)

**Student Name:**

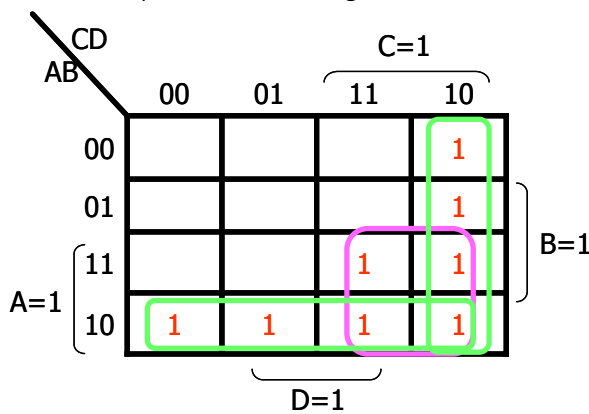
**Student Number:**

**Q1. (20 points)** Given the function  $F(A,B,C,D) = AB'C' + AC + A'CD'$

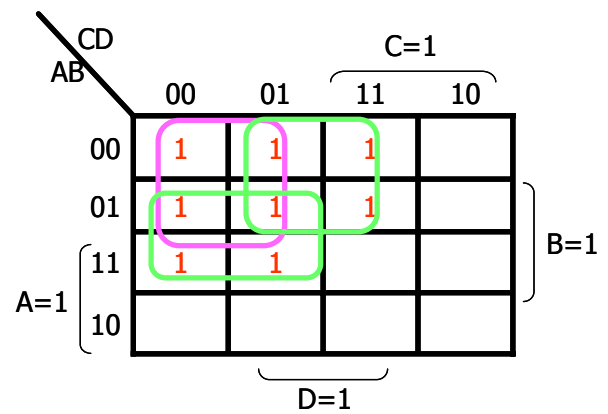
- Plot the K-Map for  $F(A,B,C,D)$
- Determine the Prime Implicants and the Essential Prime Implicants for function  $F(A,B,C,D)$ .
- Simplify the function  $F(A,B,C,D)$  in the form of sum of products
- Simplify the function  $F(A,B,C,D)$  in the form of product of sums
- Implement the circuit in part (d) with NOR gates.

**Solution:**

a) The K-Map is as shown in figure:



K-map for  $F(A,B,C,D)$



K-map for  $F'(A,B,C,D)$  {NOT REQUIRED}

b) The Prime Implicants are:  $AB', CD', AC$

The Essential Prime Implicants are:  $AB', CD', AC$

c)  $F(A,B,C,D) = AB' + AC + CD'$

d)  $F'(A,B,C,D) = BC' + A'C' + A'D' \rightarrow$

therefore,  $F(A,B,C,D) = (B'+C)(A+C)(A+D')$

e) The implementation for part (d) is as shown:

