DCS Tut-3

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22CS3037

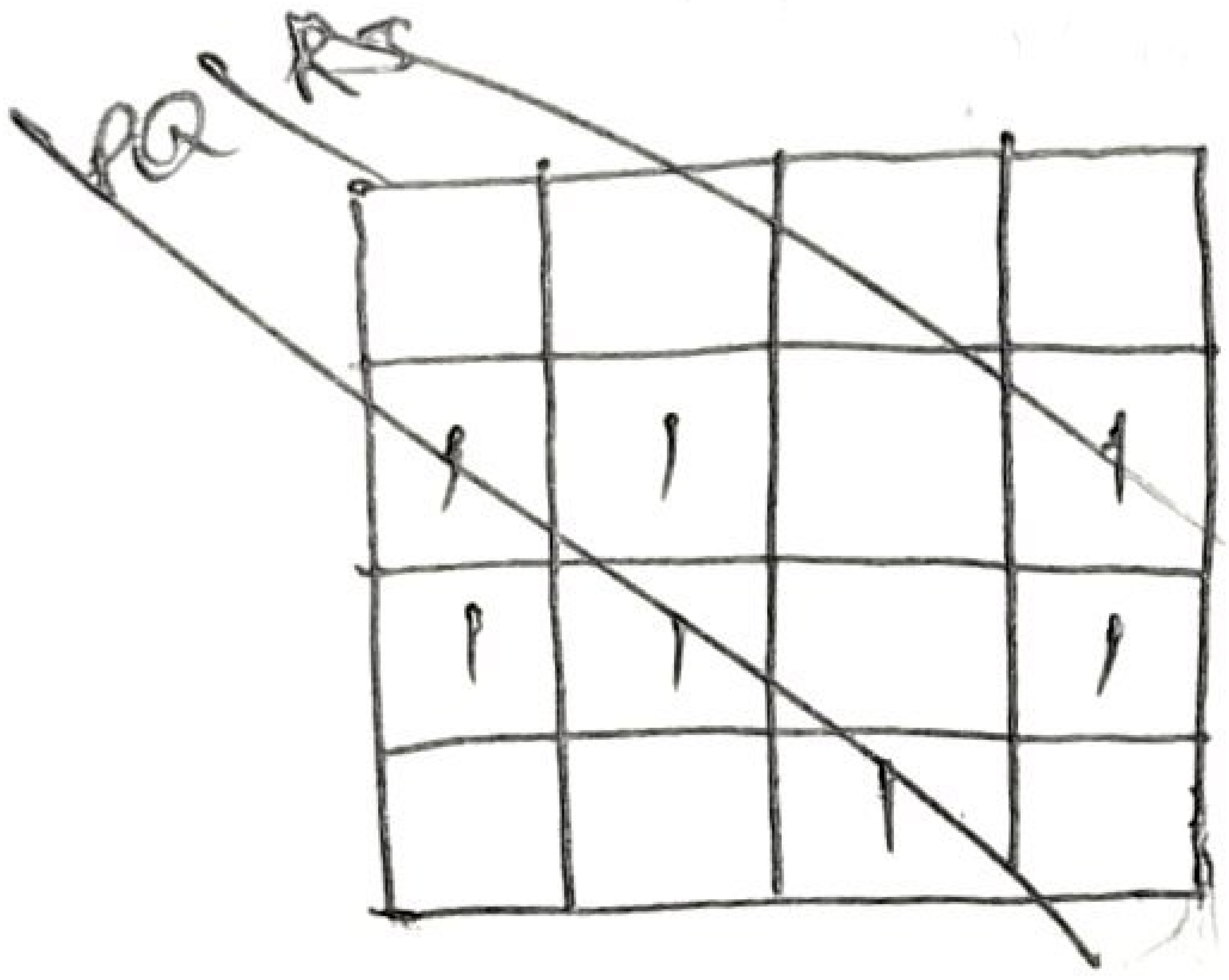
Q.1) $F(PQRS) = PQ + \bar{P}QR + \bar{P}Q\bar{R}S$

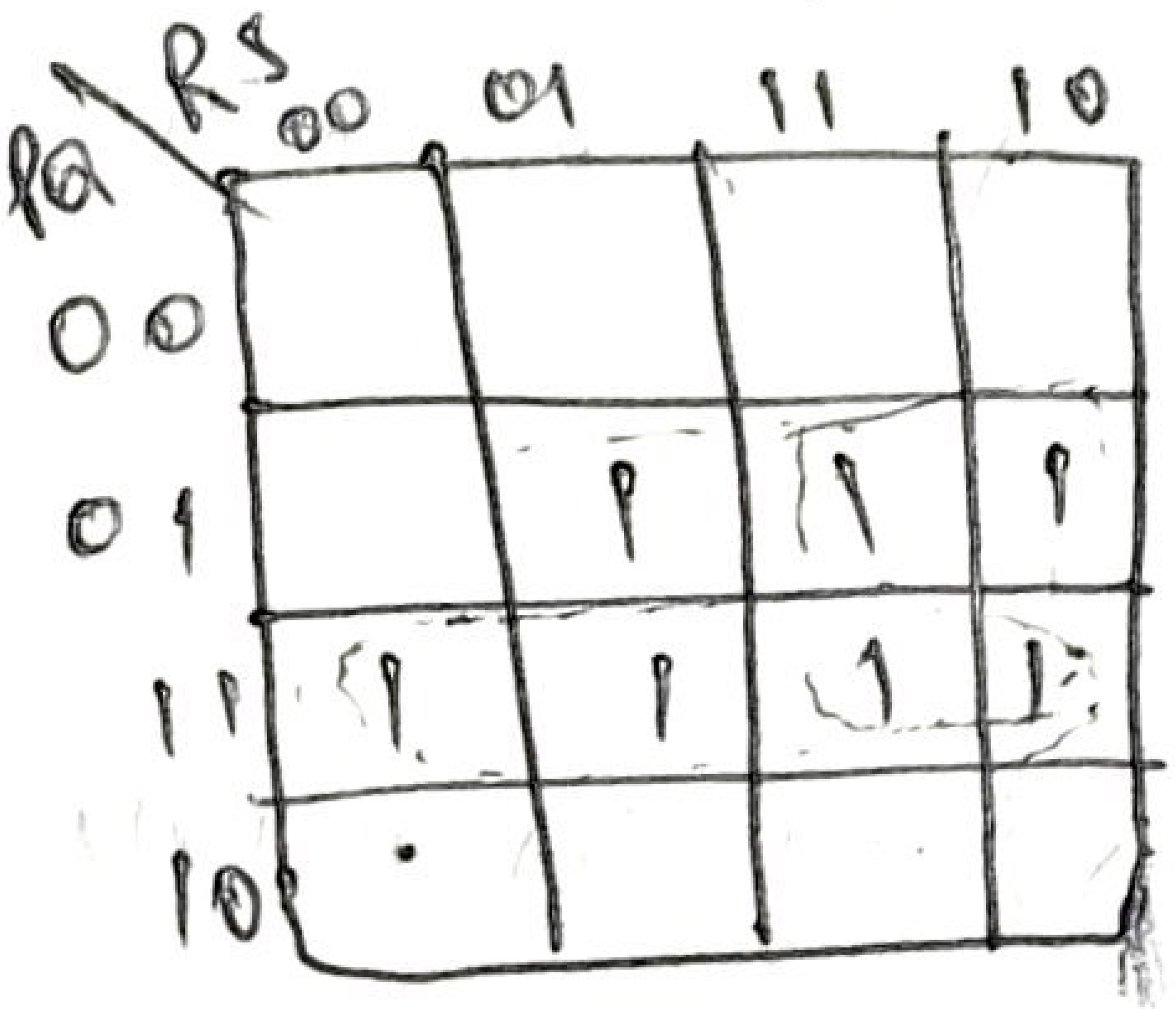
$= PQ(R+\bar{R})(S+\bar{S}) + \bar{P}QR(S+\bar{S}) + \bar{P}Q\bar{R}S$

$= PQRS + PQR\bar{S} + PQ\bar{R}S + PQ\bar{R}\bar{S} + \bar{P}QRS$

$+ \bar{P}QR\bar{S} + \bar{P}Q\bar{R}S$

$= m_{15} + m_{14} + m_{13} + m_{12} + m_7 + m_6 + \ldots$

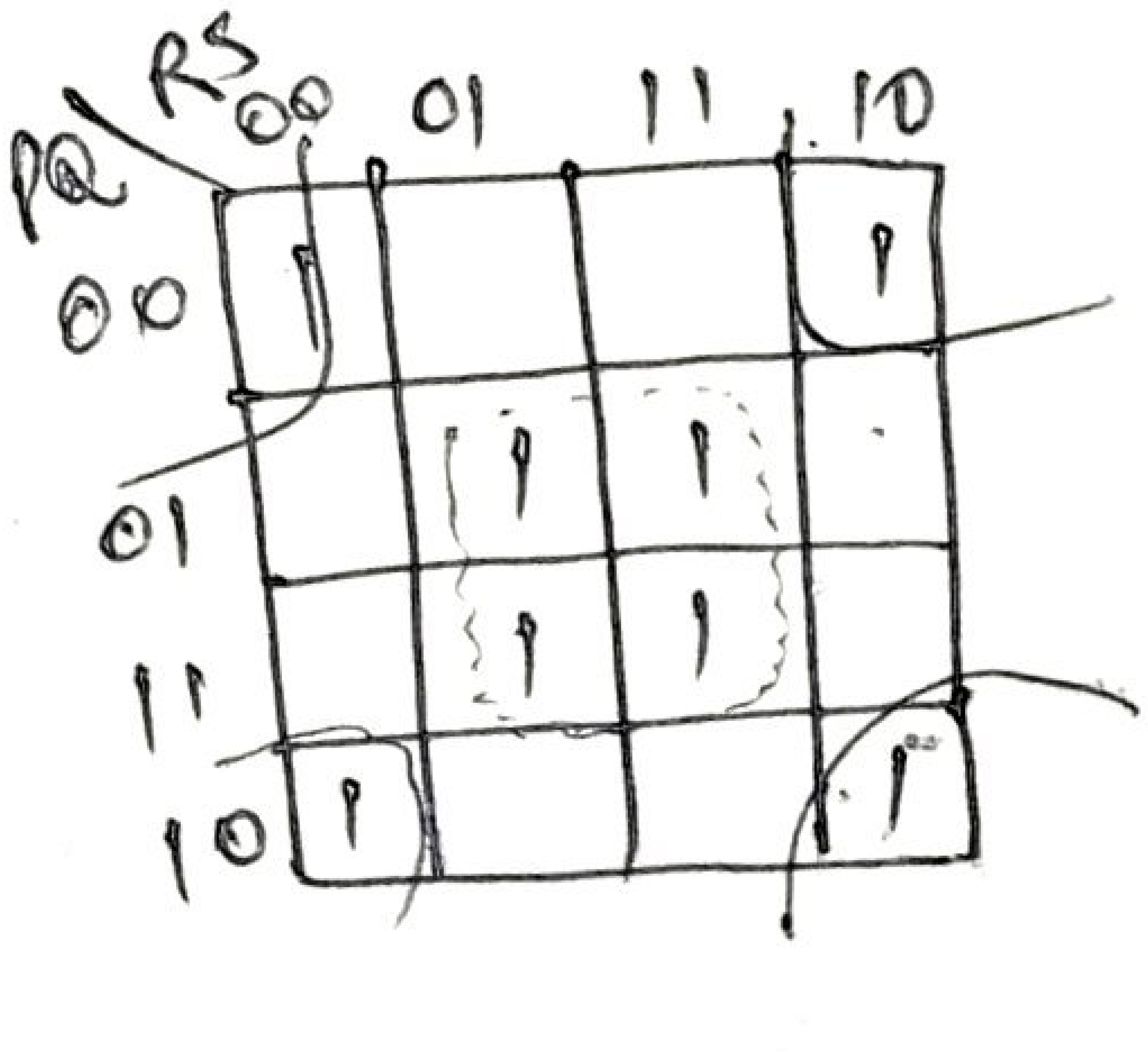




$= PQ + QS + QR$

Q2) $F(PQRS) = \{0, 2, 5, 7, 8, 10, 13, 15$

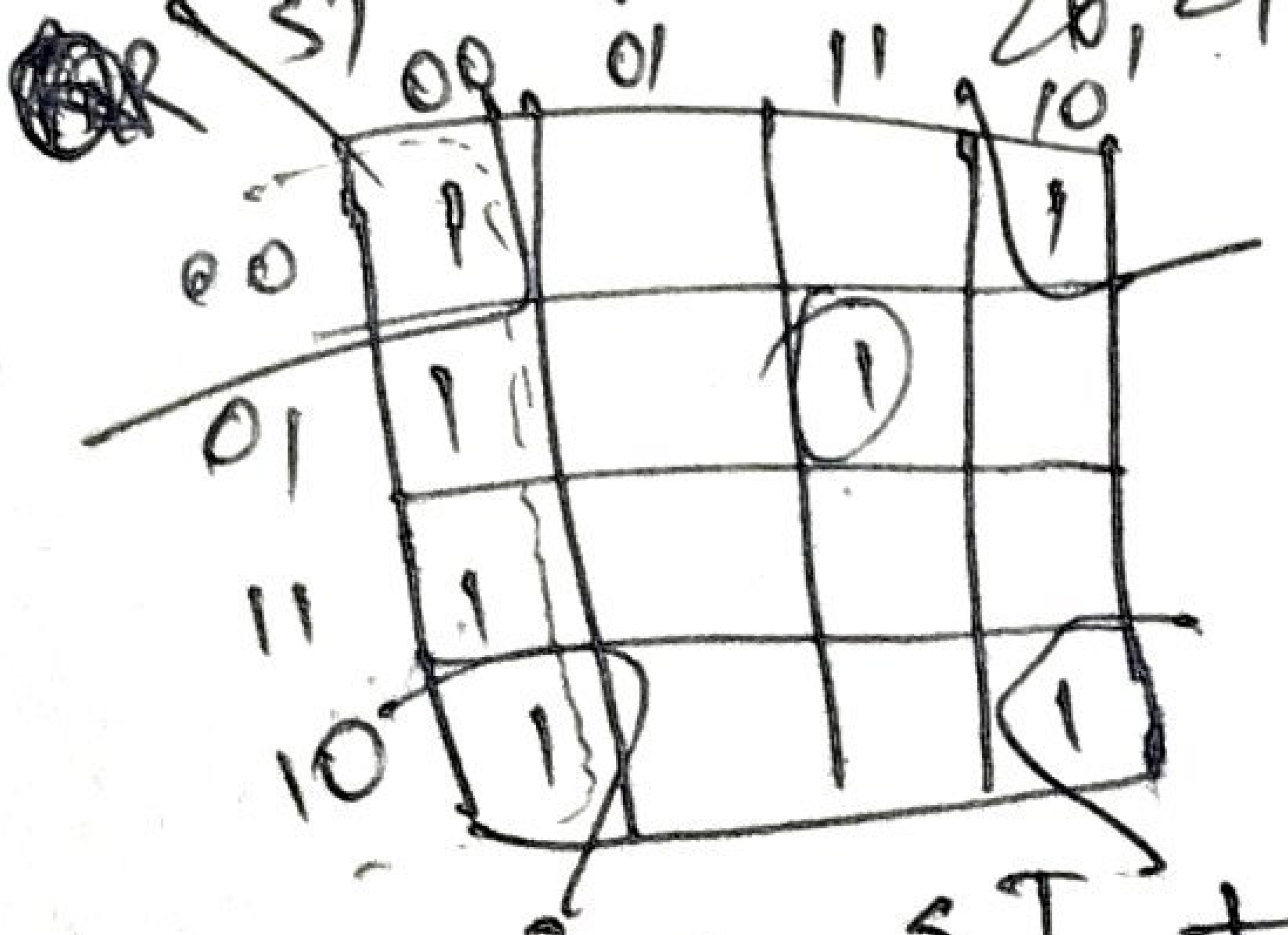
2, 7, 8, 15 → Don't care

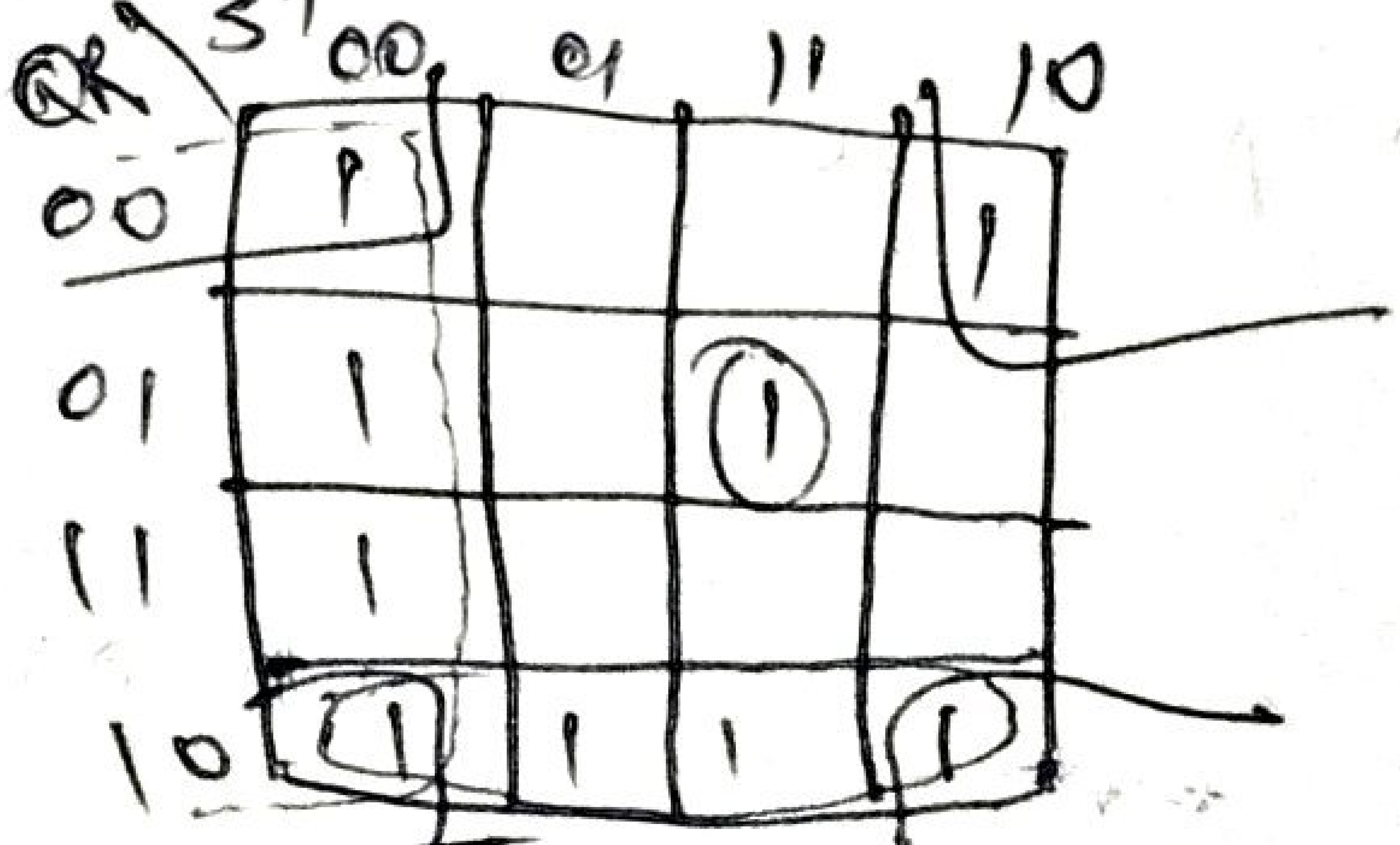


$QS + \bar{Q}\bar{S}$

Q3) $F(PQRST) = \sum(0, 2, 4, 7, 8, 10, 12, 16, 18, 20, 23, 24, 25, \ldots,$
$26, 27, 28)$

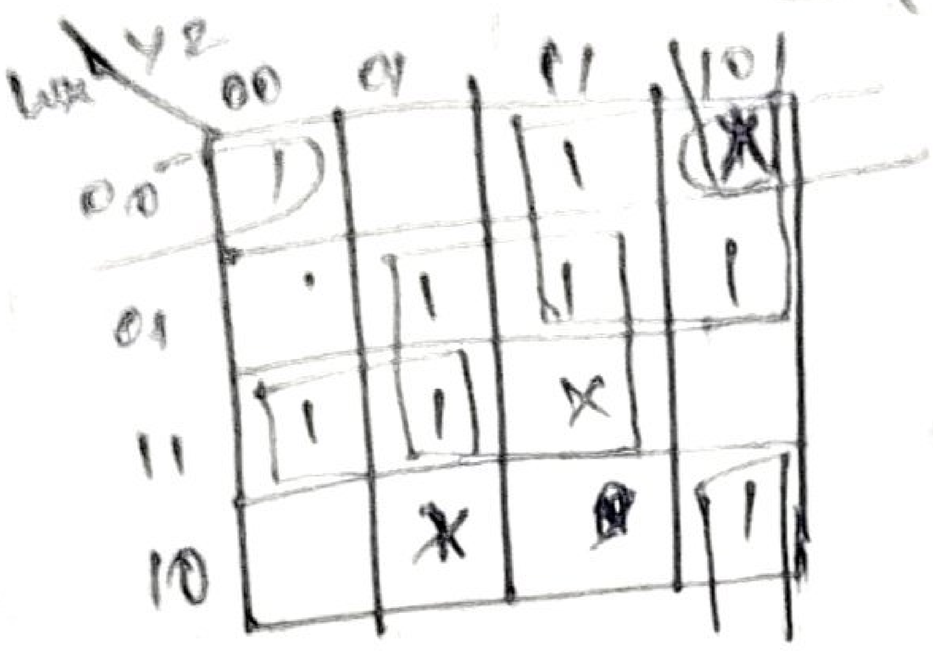
$\bar{P}$ P





$F = ST + \bar{R}\bar{T} + PQ\bar{R} + \bar{Q}RST$

4) $F(W, X, Y, Z) = \Sigma m(0, 8, 5, 6, 7, 10, 12, 13) + \Sigma d(2, 9, 15)$



$F(W, X, Y, Z) = XZ + \bar{W}Y + \bar{X}Y\bar{Z} + WX\bar{Y} + \bar{W}\bar{X}\bar{Z}$

5) i) $\bar{A} + AB = 0$

i) $A = 0 \Rightarrow \bar{A} = 1 \Rightarrow \bar{A} + AB = 1$ ✗

$A = 1$

$A = 0$

If $B = 1$ then $AB = 1 \Rightarrow \bar{A} + AB = 1$ ✗

$\therefore B = 0$

ii) $AB = AC$

$A = 1$ & $B = 0$

$AB = 0$

$1 \cdot C = 0$

$\therefore C = 0$

iii) $AB + A\bar{C} + CD = \bar{C}D$

$A = 1$

$B = 0$

$C = 0$

$1 \cdot 0 + 1 \cdot 1 + 0 \cdot D = 1 \cdot D$

(7) $(P+\bar{Q})\{P\bar{Q}+PR)(\bar{P}\bar{R}+\bar{Q})$

$(P\bar{Q}+PR+P\bar{Q}+PR\bar{Q})(\bar{P}\bar{R}+\bar{Q})$

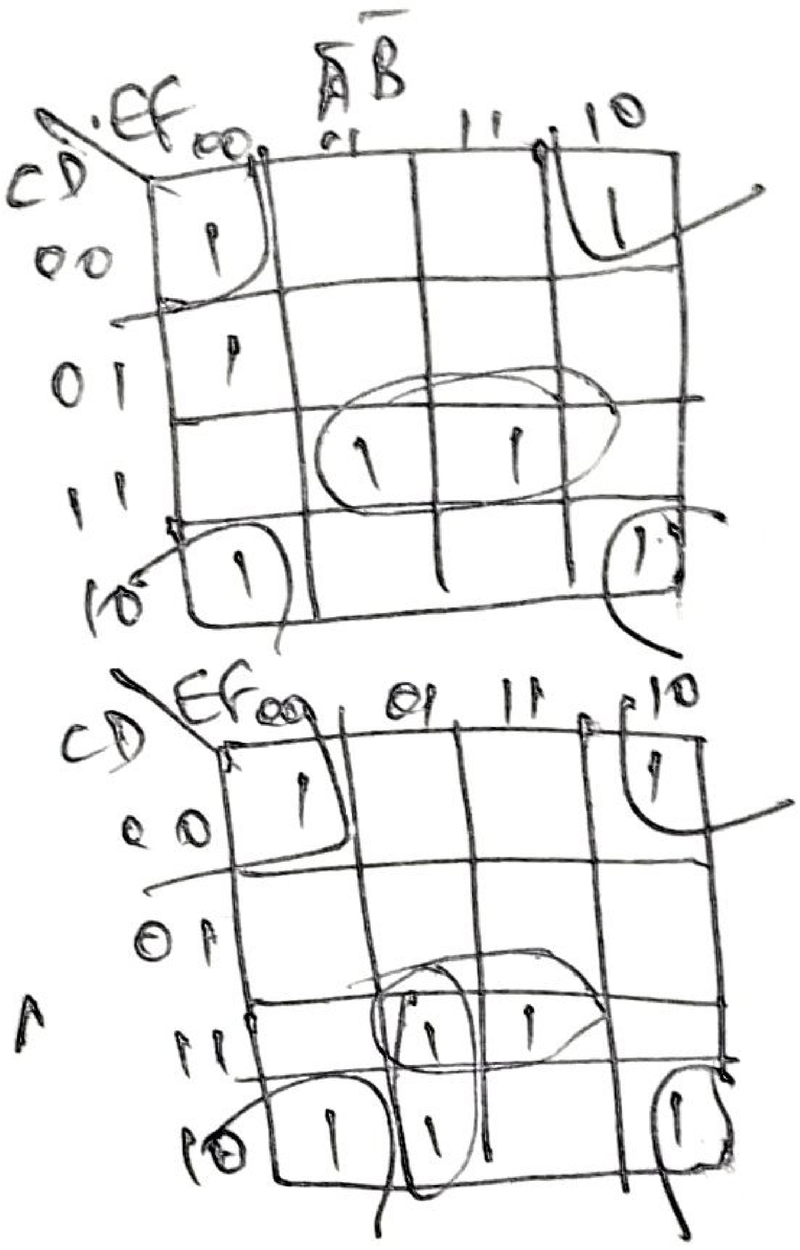
$(P\bar{Q}+PR(1+\bar{Q})(\bar{P}\bar{R}+\bar{Q})$

$(P\bar{Q}+PR)(\bar{P}\bar{R}+\bar{Q})$

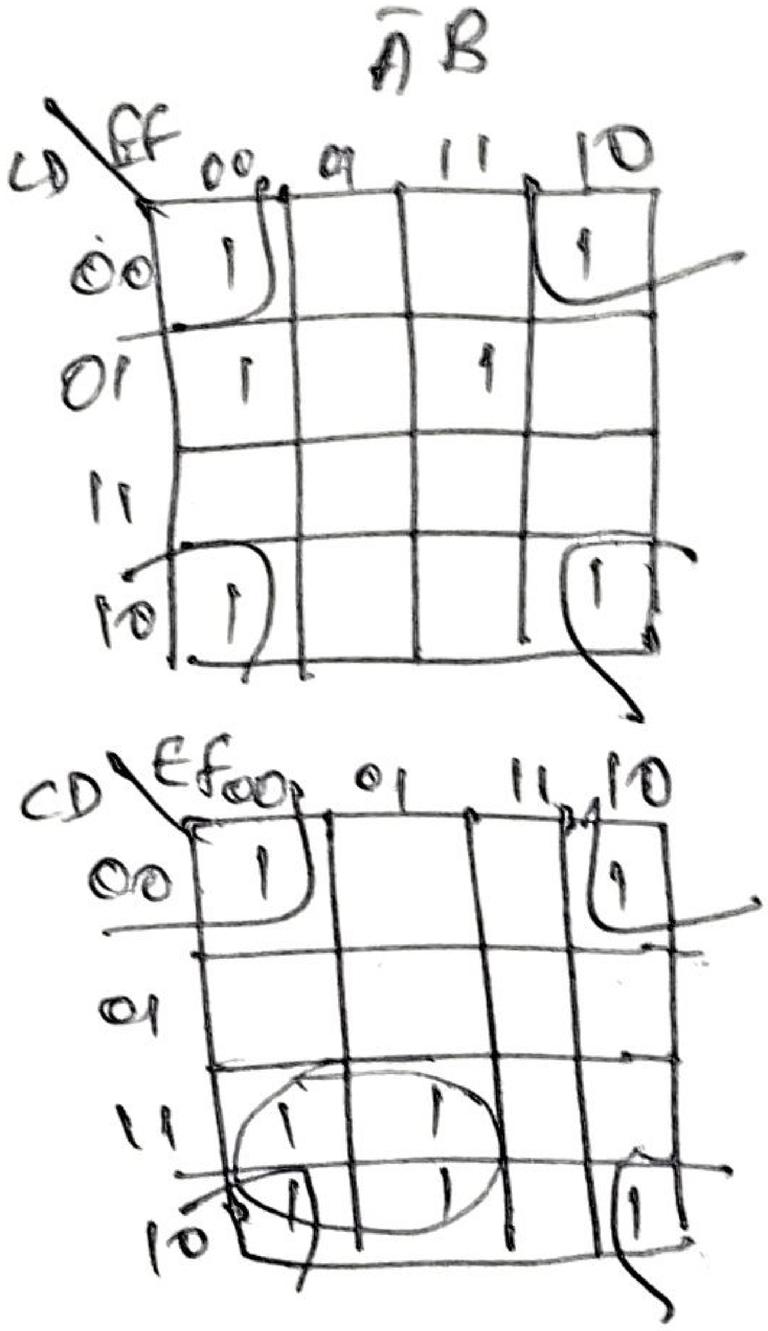
$P\bar{Q}+PR\bar{Q}$

$P\bar{Q}$

(8)



$A\bar{B}$



AB

$F = \bar{A}B\bar{C}DEf + \bar{F}\bar{D} + \bar{A}\bar{C}\bar{E}\bar{F} + \bar{B}CDF + AEFC + ABEC$

(10) $F = \bar{x}\bar{y} + xy + \bar{x}y$

$= (\bar{x}\bar{y} + \bar{x}y) + xy$

$= \bar{x}(\bar{y}+y) + xy$

$= \bar{x} + xy$

$= \bar{x} + y$