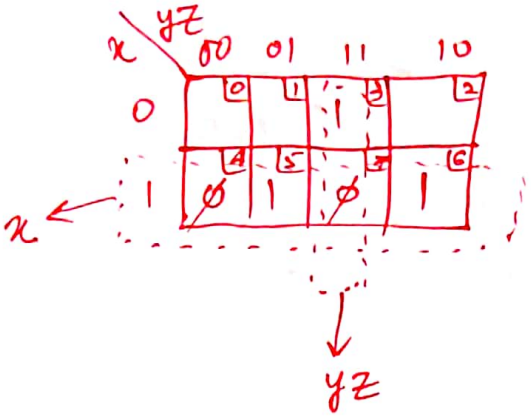
Tutorial - 7 (Solutions)

Q1



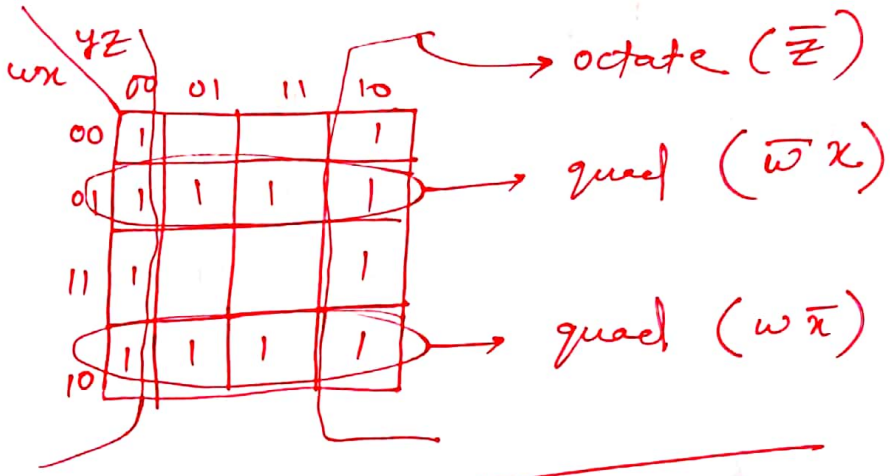
$x + yz$

↓ must be from a quad (2 variables are eliminated)

↓ must be from a pair (1 variable is eliminated)

ANS: $\Sigma(4, 7)$

Q2

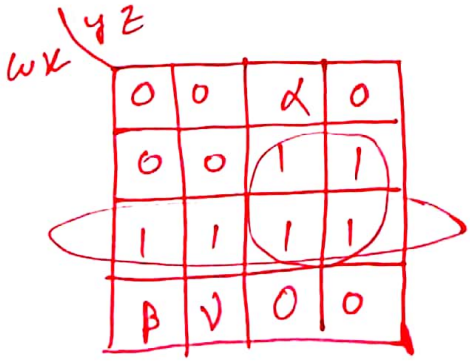


All are essential

So only one minimal expression is possible.

$\bar{z} + \bar{w}x + w\bar{x}$

Q3



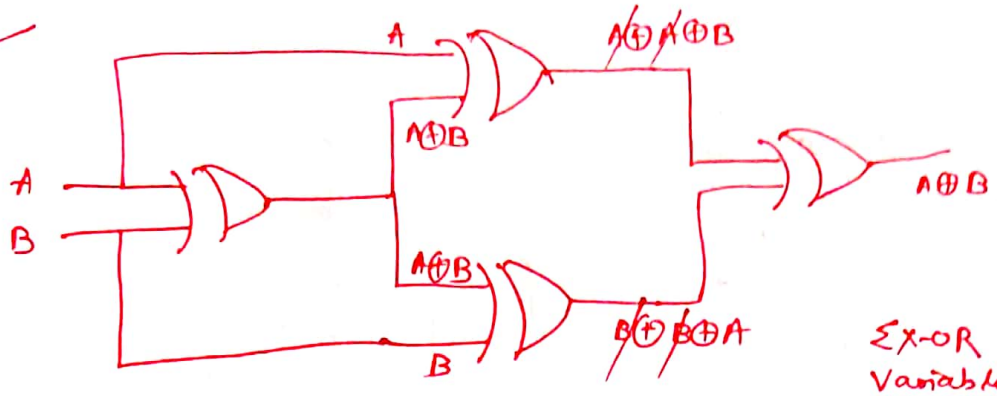
d.c. → α, β, ν are not ~~not~~ required for SOP minimization.

Even we consider them, we will not get any further reduction.

So $\langle \alpha, \beta, \nu \rangle = \langle 0, 0, 0 \rangle$.

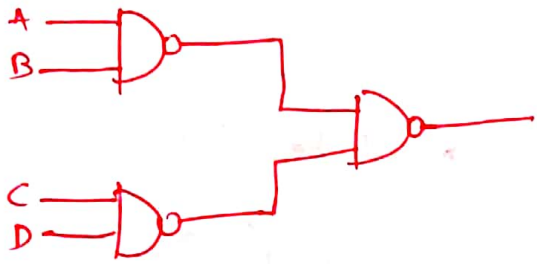
They may help in POS minimization.

Q4



Ex-OR of same Variable is 0.

Q5



$$\overline{\overline{A \cdot B} \cdot \overline{C \cdot D}}$$

$$= \overline{\overline{A \cdot B}} + \overline{\overline{C \cdot D}}$$

$$= A \cdot B + C \cdot D$$

Q6

$$\begin{array}{r} (4\ 5\ 6\ 7)_8 \\ +\ (2\ \beta\ \alpha\ 5)_8 \\ \hline (7\ 1\ \beta\ \alpha)_8 \end{array}$$

$7 \quad 1 \quad 3 \quad 4$

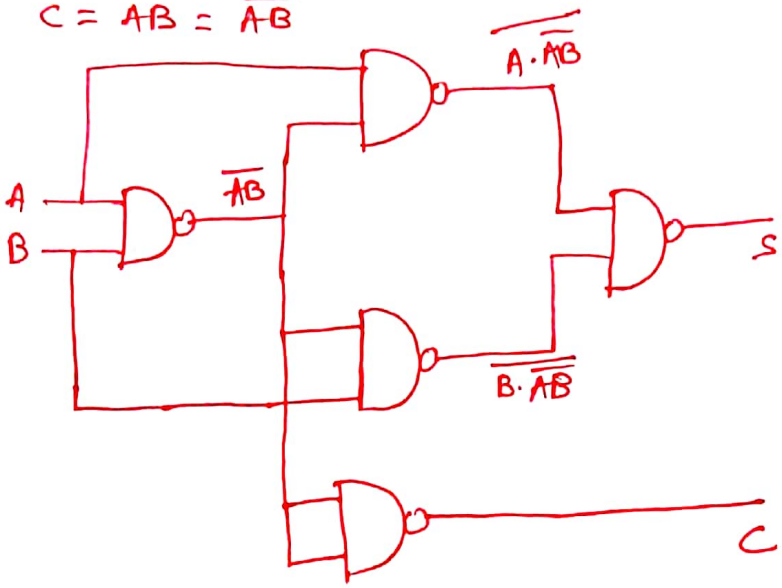
7
10
11
12
13
14

$(12)_{10} = (14)_8$
$(11)_{10} = (13)_8$
$(9)_{10} = (11)_8$
$(7)_{10} = (7)_8$

Q7 NAND logic.

$$S = A\bar{B} + \bar{A}B = A\bar{B} + A\bar{A} + \bar{A}B + B\bar{B}$$
$$= A(\bar{A}+\bar{B}) + B(\bar{A}+\bar{B})$$
$$= A\cdot\overline{AB} + B\cdot\overline{AB}$$
$$= \overline{A\cdot\overline{AB}}\cdot\overline{B\cdot\overline{AB}}$$

$$C = AB = \overline{\overline{AB}}$$



NOR logic.

$$S = A\bar{B} + \bar{A}B = A\bar{B} + A\bar{A} + \bar{A}B + B\bar{B}$$
$$= A(\bar{A}+\bar{B}) + B(\bar{A}+\bar{B})$$
$$= (A+B)(\bar{A}+\bar{B})$$
$$= \overline{\overline{A+B} + \overline{\bar{A}+\bar{B}}}$$

$$C = AB = \overline{\overline{AB}} = \overline{\bar{A}+\bar{B}}$$