① ⓐ $20_{10} = {}_2\frac{20}{10}\,0 \;\; {}_2\frac{10}{5}\,0 \;\; {}_2\frac{5}{2}\,1 \;\; {}_2\frac{2}{1}\,0 = 10100_2$.

Desimal → Heksa desimal.

$16\frac{20}{4}\,1$

$20_{10} = 14_{16}$.

ⓒ 10100_2

00110_2 +

11010_2

→ 1 1 0 1 0

$= 2^4 + 2^3 + 0^2 + 2^1 + 0^0$

$= 16 + 8 + 0 + 2 + 0$

$= 26_{10}$

ⓓ 10100_2

11110_2 +

110001_2

→ 1 1 0 0 0 1

$= 2^5 + 2^4 + 0^3 + 0^2 + 0^1 + 2^0$

$= 32 + 16 + 0 + 0 + 0 + 1$

$= 49_{10}$.

ⓑ $4_{10} = 100_2$

→ 1's Complement = $011_2 + 1 = 100_2$

→ di padding 0100_2

Untuk menjadi −4 ditambah sign bit (−) yaitu 1 di MSB

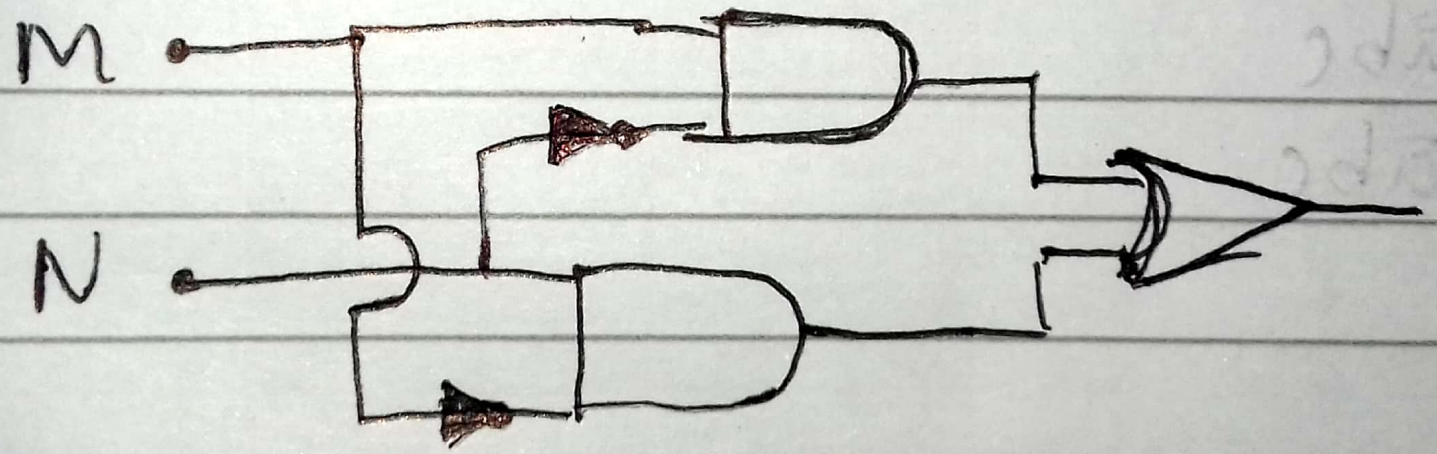
Jadi hasilnya adalah 10100_2

↑ sign bit (−)

② $\overline{(M+\bar{N})(\bar{M}+N)} = (\bar{M}\cdot\bar{N}) + (\bar{\bar{M}}\cdot\bar{N})$

$= (\bar{M}\cdot N) + (M\cdot\bar{N})$

$= \bar{M}\cdot N + M\cdot\bar{N}$



③ $(\bar{a}\bar{b}+c)(a+b)(\overline{\bar{b}+ac}) = \bar{a}bc$

$(\bar{a}\bar{b}+c)(a+b)(\bar{\bar{b}}+\bar{a}\bar{c}) = \bar{a}bc$

$(\bar{a}\bar{b}+c)(a+b)(\bar{\bar{b}}+\bar{a}+\bar{\bar{c}}) = \bar{a}bc$

$(\bar{a}\bar{b}+c)(a+b)(b(\bar{a}+\bar{\bar{c}})) = \bar{a}bc$

$\bar{a}ab+\bar{a}b\bar{b}+ac+bc+\bar{a}b+b\bar{c} = \bar{a}bc$

$0.\bar{b}+0.\bar{a}+ac+bc+(\bar{a}b+b\bar{c}) = \bar{a}bc$

$ac+bc+\bar{a}b+b\bar{c} = \bar{a}bc$

$ac+\bar{a}b(c+\bar{c}) = \bar{a}bc$

$ac+\bar{a}b.1 = \bar{a}bc$

$ac+\bar{a}b = \bar{a}bc$

$\bar{a}bc = \bar{a}bc$

4 a.

P	Q	R	S	biner	Z	lampu G.	
0	0	0	0	0000	0	0	X
0	0	0	1	0001	1	0	X
0	0	1	0	0010	2	1	$\bar{P}\bar{Q}R\bar{S}$
0	0	1	1	0011	3	1	$\bar{P}\bar{Q}RS$
0	1	0	0	0100	4	1	$\bar{P}Q\bar{R}\bar{S}$
0	1	0	1	0101	5	1	$\bar{P}Q\bar{R}S$
0	1	1	0	0110	6	1	$\bar{P}QR\bar{S}$
0	1	1	1	0111	7	0	X
1	0	0	0	1000	8	1	$P\bar{Q}\bar{R}\bar{S}$
1	0	0	1	1001	9	1	$P\bar{Q}\bar{R}S$
1	0	1	0	1010	A	1	$P\bar{Q}R\bar{S}$
1	0	1	1	1011	B	1	$P\bar{Q}RS$
1	1	0	0	1100	C	0	X
1	1	0	1	1101	D	0	X
1	1	1	0	1110	E	1	$PQR\bar{S}$
1	1	1	1	1111	F	1	PQRS

(b)

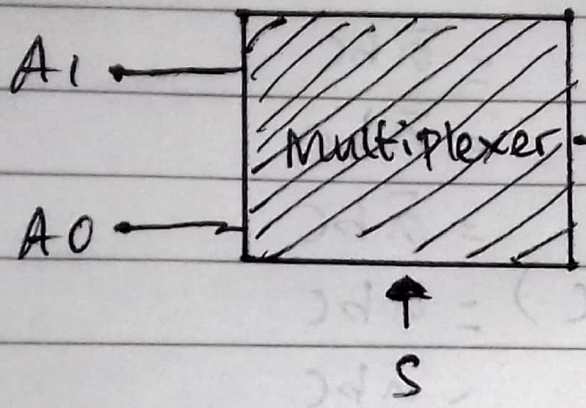
	$\bar{R}\bar{S}$	$\bar{R}S$	RS	$R\bar{S}$
$\bar{P}\bar{Q}$	0 1	0 2	1 3	1 4
$\bar{P}Q$	1 5	1 6	0 7	1 8
PQ	0 9	0 10	1 11	1 12
$P\bar{Q}$	1 13	1 14	1 15	1 16

loop 4. = $P\bar{Q} + R\bar{S}$

loop 2 = $\bar{P}Q\bar{R} + PQR + \bar{Q}RS$

(c) SOP = $\bar{P}Q\bar{R} + PQR + \bar{Q}RS + P\bar{Q} + R\bar{S}$

(5)



jika S = 0 maka Z = A_0

jika S = 1 maka Z = A_1

Tuliskan output Z dalam bentuk SOP:

S	A_0	A_1	Z	
0	0	0	0	X
0	0	1	0	X
0	1	0	1	$\bar{S} A_0 \bar{A}_1$
0	1	1	1	$\bar{S} A_0 A_1$
1	0	0	0	X
1	0	1	1	$S \bar{A}_0 A_1$
1	1	0	0	X
1	1	1	1	$S A_0 A_1$

$$SOP = \bar{S} A_0 \bar{A}_1 + \bar{S} A_0 A_1 + S \bar{A}_0 A_1 + S A_0 A_1$$