[illegible]

[illegible]

(2) [illegible]

$$25\ dB - 35\ dB + 50\ dB - 40\ dBm + 800\ dBm = 800\ dBm$$

~~สัญญาณขาเข้า = 800 dBm~~

~~$800\ dBm = 10 \log P_{out}$~~

$$P_{in} = 10\ mW$$

$$P_{in}(dBm) = 10 \log \frac{0.01}{0.001}$$

$$P_{in}(dBm) = 10\ dBm$$

กำลังขาออก $= 800\ dBm + 10\ dB$

$$= 810\ dBm$$

$$P\ dBm = 10 \log \frac{P}{1\ mW} = 10 \log \frac{P}{0.001}$$

$$\frac{810}{10}\ dBm = \log \frac{P}{0.001}$$

$$81 = \log \frac{P}{0.001}$$

$$P_{out} = (10)^{81} \times 0.001 = 10^{78}\ W.$$

$$80\ dBm = 10 \log \frac{P}{0.001}$$

$$40 = \log \frac{P}{0.001}$$

$$P = 10^{40} \times (0.001) = 10^{37}\ \text{watt}$$

$$40\ dBm = 10 \log \frac{P}{0.001}$$

$$P = 10^{4}(0.001) = 10\ W. \quad \text{——}$$

$$50\ dBm = 10 \log \frac{P}{0.001}$$

$$P = 10^{5} \times (0.001)$$

$$P = 100\ kW.$$

$$100\ kW = \frac{P_{out}}{P_{in}} = \frac{P_{out}}{10\ mW.}$$

$$P_{out} = 100\ kW \times 10\ mW$$

$$P_{out} = 1000\ watt \quad \text{——}$$

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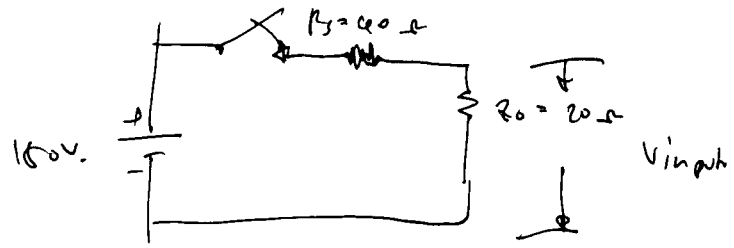
(3)

$V_{input} = 150\ V$, $R_s = 40\ \Omega$

$R_L = 200\ \Omega$

$Z_0 = 20\ \Omega$

(a) จงหา V_{input}



$$V_{input} = \frac{150 \times 20}{40 + 20} = 50\ V$$

$$V_i = 50\ V \longrightarrow$$

$V_i = 50V$

(b) จงหา V.S.W.R ของสายนี้

$$\Gamma = \frac{Z_L - Z_0}{Z_L + Z_0} = \frac{200 - 20}{200 + 20} = 0.818$$

$$V_{R(1)} = \Gamma V_i = 0.818 \times 50$$

$$V_{R(1)} = 40.9\ V.$$

$V_{R(1)} = 40.9\ V$

(c) ที่ปลายสายมีแรงดันรวมเท่าไร

$$V_{total} = V_i + V_{R(1)} = 50 + 40.9$$

$$V_{total} = 90.9\ V \longrightarrow$$

[illegible]

$$\Gamma = \frac{Z_L - Z_0}{Z_L + Z_0} = \frac{40 - 20}{40 + 20}$$

$\Gamma = 0.333$ ⟶ [illegible]

[illegible]

$V_r(2) = \Gamma V_r(1) = 0.333 \times 40.9$

$V_r(2) = 13.619$ V

13.619 V ⟶

$V_{total} = 90.9 + 13.619 = 104.5$ V.

[illegible] Load [illegible]

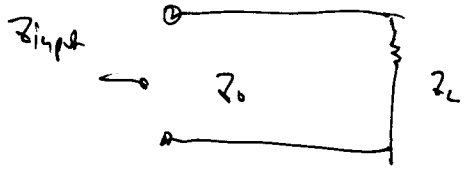
$V_r(3) = \Gamma V_r(2)$

$= 0.818 \times 13.619$

$V_r(3) = 11.14$ V

⟵ 11.14 V

Soln (a) Z_{input} $Z_0 = 75\ \Omega$, $Z_L = 100\ \Omega$, $\ell = \frac{\lambda}{4}$



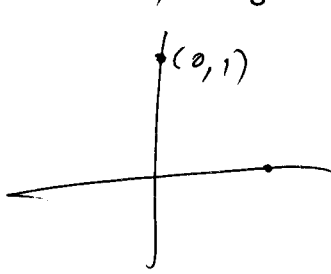
$$Z_{input} = Z_0 \frac{Z_L + j Z_0 \tan \beta L}{Z_0 + j Z_L \tan \beta L}$$

$$\beta = \frac{2\pi}{\lambda}$$

$$\beta L = \frac{2\pi}{\lambda}\left(\frac{\lambda}{4}\right) = \frac{\pi}{2} = 90^\circ$$

$$Z_{input} = 75 \frac{100 + j\, 75 \tan 90^\circ}{75 + j\, 100 \tan 90^\circ}$$

$$Z_{input} = 75 \frac{100 + j\, 75(\infty)}{75 + j\, 100(\infty)}$$



$Z_{input} = 0\ \Omega$