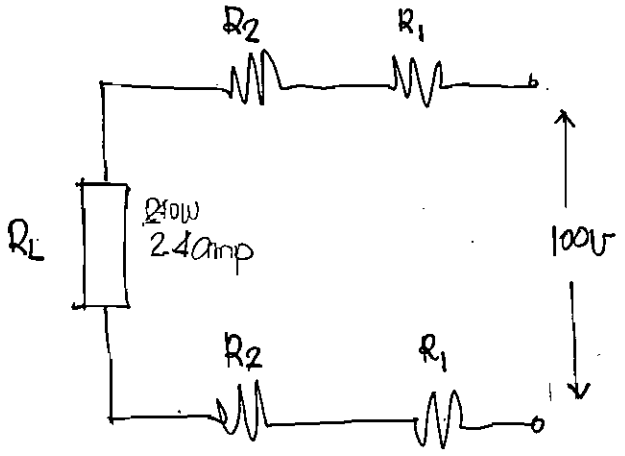
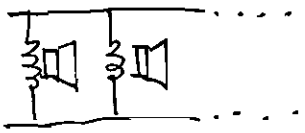
FOR 16# of Speakers



$$R_{SPEAKER} = \frac{V^2}{P}$$
$$= \frac{100^2}{15W}$$
$$= 666.67\Omega$$

No. of Speakers = 16pcs.

R_L =



$$\text{Total } R_L = \frac{666.67\Omega}{16}$$
$$= 41.67\Omega$$

$$V_{R_L} = \frac{41.67\Omega\,(100V)}{41.67\Omega + 2(R_1+R_2)}$$
$$= 86.04V \longleftarrow \boxed{\text{voltage @ } R_L}$$

$$P_{R_L} = \frac{86.04^2}{41.67\Omega}$$
$$= 177.62W$$

* $\text{Log}_b(X/Y) = \text{Log}_b X - \text{Log}_b Y$

$$R_1 = 4.7\frac{\Omega}{km} \times 0.315km$$
$$= 1.48\Omega$$

$$R_2 = 7.6\frac{\Omega}{km} \times 0.215km$$
$$= 1.9\Omega$$

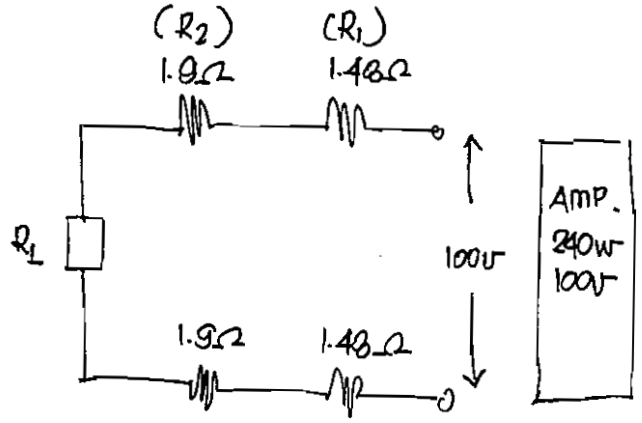
$$dB_{Loss} = 10\text{Log}\,P_S - 10\text{Log}\,P_L$$

$$dB_{Loss} = 10\text{Log}\left(\frac{P_S}{P_L}\right)$$

↳ Should be less than 1.5dB

$$\therefore dB_{Loss} = 10\text{Log}\left(\frac{240W}{177.62W}\right)$$
$$= 1.31dB$$

NOGIENUGZ



R_L = Lump load of the 16 speakers

R_1 = R of 8P - 4mm² (315m)

R_2 = R of 2P - 2.5mm² (250m)

$$R_T = \frac{100^2}{240}$$

$$= 41.67\Omega$$

$$R_L = 41.67\Omega - 2(1.48+1.9)$$

$$= 34.91\Omega$$

$$V_{R_L} = \frac{34.91(100V)}{41.67\Omega}$$

$$= 83.78V$$

$$P_{R_L} = \frac{(83.78V)^2}{34.91\Omega}$$

$$= 201.06 \text{ watts}$$

$$dB\ Loss = 10Log\left[\frac{201.06}{240W}\right]$$

$$= 0.769$$

dB Loss = 0.769

VE1BLL

$$I_{SPEAKERS} = \frac{15W\ (16\ pcs.)}{100}$$

$$= 2.4 \text{ amp}$$

$$P_{Loss} = 2\left[P_{R_1} + P_{R_2}\right]$$

$$= 2\left[2.4^2(1.48) + 2.4^2(1.9)\right]$$

$$= 38.94 \text{ watts}$$

$$dB_{Loss} = 10Log\left[\frac{240 - 38.94}{240}\right]$$

$$= 0.769$$

$dB_{Loss} = 0.769$