4) Noise factor

$$= \frac{\text{Total Noise power delivered to load}}{\text{Output Noise power due to source noise only}}$$

→ From 1), $P_L\big|_{\text{due to } R_S} = \frac{\overline{V_{Rs}}^2}{4R_L}\left(\frac{R_o - R_x}{R_o + R_x}\right)^2$

$$= kT\Delta f \frac{1}{L}$$

$$\therefore F = \frac{kT\Delta f}{kT\Delta f \frac{1}{L}} = L$$

5) $P_L\big|_{\text{due to } R_S} = kT\Delta f\left(\frac{R_o - R_x}{R_o + R_x}\right)^2$

$$= 1.38\times10^{-23}\times300\left(\frac{50-8.55}{50+8.55}\right)^2$$

$$= 2.07\times10^{-21}\ W/Hz \quad -(A)$$

$P_L\big|_{\text{due to left } R_x} = kT\Delta f \cdot \frac{R_x}{R_o}\left(\frac{R_o - R_x}{R_o + R_x}\right)^2 = 2.07\times10^{-21}\times\frac{R_x}{R_o}$

$$= 354.8\times10^{-24}\ W/Hz \quad -(B)$$

$P_L\big|_{\text{due to right } R_x} = kT\Delta f \frac{R_x}{R_o}$

$$= 1.38\times10^{-23}\times300\times\frac{8.55}{50}$$

$$= 707.94\times10^{-24}\ W/Hz \quad -(C)$$

$P_L\big|_{\text{due to } R_y} = kT\Delta f \frac{R_y}{R_o}\left(\frac{2R_o}{2R_y + R_o + R_x}\right)^2$

$$= 1.38\times10^{-23}\times300\,\frac{141.9}{50}\left(\frac{2\times50}{2\times141.9+50+8.55}\right)^2$$

$$= 1\times10^{-21}\ W/Hz \quad -(D)$$