Solutions

1.

a. $A_{in,IP3} = \sqrt{\frac{4}{3}\left|\frac{\alpha_1}{\alpha_3}\right|}$

$= \sqrt{\frac{4}{3} \times 5}$

$= 2.58$ volts.

$= 8.23$ dBV.

b. $2\omega_1$

$\frac{\alpha_2 A^2}{2} = \frac{2.5 \times 5^2}{2} = 31.25$ V $= 29.89$ dBV

$\omega_1 - \omega_2$

$\alpha_2 A^2 = 62.5$ V $= 35.91$ dBV

c. $A_{in,IP2} = \frac{\alpha_1}{\alpha_2} = \frac{10}{2.5} = 4$ volts $= 12.04$ dBV.

2.

$\overline{V_n^2} = \frac{8}{3}\frac{kT}{g_m} = \frac{8}{3} \times \frac{1.38 \times 10^{-23} \times 298}{0.32 \times 10^{-3}}$

$= 3.427 \times 10^{-17}$ V^2/Hz.

DOMS | Page No.
Date / /

$$\overline{I_n^2} = \frac{8kT}{3\beta m |Z_{IN}|^2} = \frac{8 \times 1.38 \times 10^{-23} \times 298}{3 \times 0.32 \times 10^{-3} \times \frac{1}{(\omega \times 2 \times 10^{-12})^2}}$$

$$= 1.37 \times 10^{-40} \omega^2 A^2/Hz$$