Find the A.C. gain of the amplifier in Fig.1

\[ A_v = \frac{-12K}{3K} = -4 \]

Choose \( V_{EQ} \) so that the amplifier is optimally biased for sinusoidal operation when the switch is open.

\[ V_{EQ} = \frac{1}{5} \times 7.5 = 1.5V \]

Determine \( I_{CQ} \)

\[ I_{CQ} = 0.5\text{ma} \]

Choose \( R_1 \) and \( R_2 \) so that the amplifier input impedance is 20K for frequencies at which \( C_1 \) offers negligible reactance. Neglect the effect of \( I_B \). \( V_{BEQ} = 0.6V \)

\[
\begin{align*}
R_1 R_2 &= 20K \\
\frac{R_1 + R_2}{R_1 R_2} &= 2.1 \\
R_1 &= 15(20K) \\
R_2 &= 15(20K)
\end{align*}
\]

\[ R_1 = 143K \\
R_2 = 23.2K \]

The voltage \( v_S \) is a sinewave. Find the maximum peak value of \( v_S \) that generates an undistorted output with the switch open.

\[ v_{SMAX}\text{(sw open)} = 1.5V \]

Find the amplifier output impedance with the switch open.

\[ Z_o = 12K \]

Find the amplifier gain with the switch closed.

\[ 12K \parallel 24K = 8K \]

\[ A_v\text{(sw closed)} = \frac{-8K}{3K} = -2.67 \]