1. A circuit and its phasor/impedance equivalent are shown below. Determine the current \( i(t) \), and sketch \( i(t) \) versus \( t \). Indicate the sine wave amplitude, frequency, and phase in the sketch. Note that \( \frac{1}{j} = \frac{\frac{1}{200^\circ}}{\frac{1}{200^\circ}} = 1\cdot -90^\circ = -j \).

\[
\nu(t) = 2\cos\left(\frac{1000\pi t}{1}\right)
\]
\[
\omega = \frac{1000}{\text{rad/s.}}
\]

\[
\begin{align*}
V &= \frac{1}{j\omega C} \\
Z &= R + \frac{1}{j\omega C} \\
&= 1000 - j2000
\end{align*}
\]

2. Classify each circuit below as one of the following types of filter: low-pass, high-pass, or band-pass. You can do this either by thinking about how each circuit operates as \( \omega \to 0 \) and \( \omega \to \infty \), or you can analyze the circuits as voltage dividers with impedances and study the resulting equations.