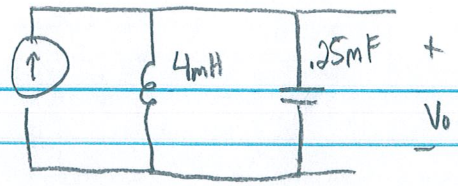
$\boxed{10.64}$



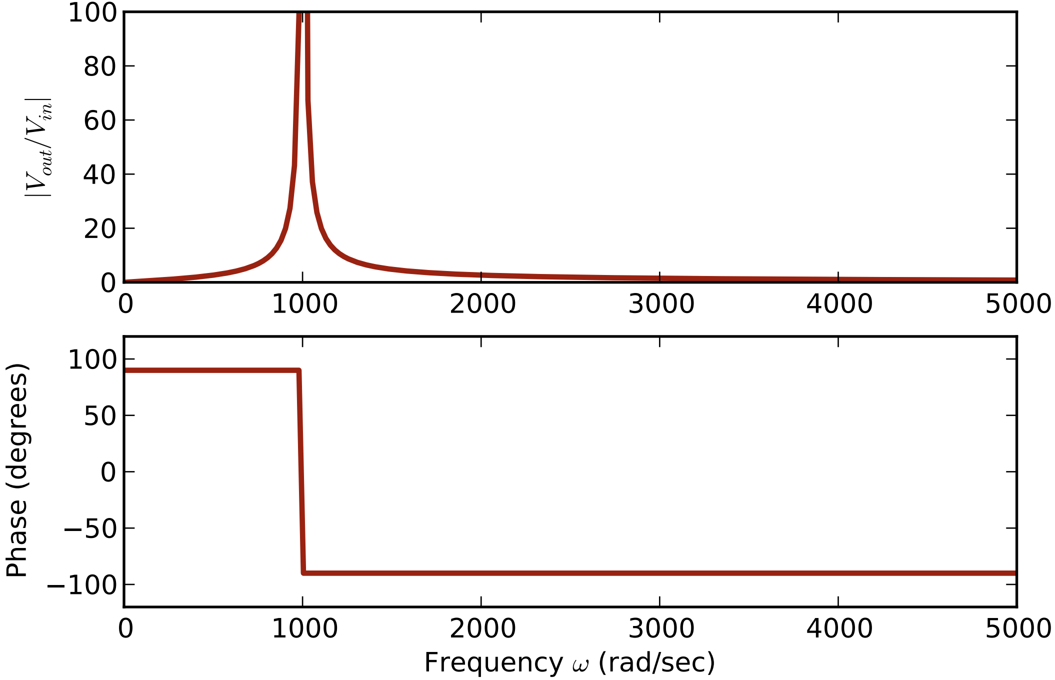
$$V_o/I_{in} = (4mH) // .25mF = \frac{(j\omega L)\left(\frac{1}{j\omega C}\right)}{j\omega L + 1/j\omega C} = \frac{j\omega L}{1-\omega^2 LC}$$

$$\boxed{|H| = \left|\frac{\omega L}{1-\omega^2 LC}\right| \quad \Theta = 90^\circ \text{ for } \omega < \tfrac{1}{\sqrt{LC}} \quad -90 \text{ for } \omega > \tfrac{1}{\sqrt{LC}}} = \boxed{\frac{.004\,\omega}{1-\omega^2\, 10^{-6}}}$$

for $\omega \to 0$: $|H| \to 0$

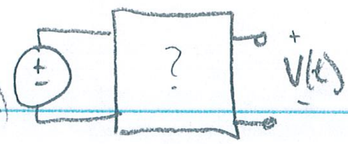
$\omega \to \infty$: $|H| \to 0$ SEE PLOT ATTACHED.

for $\omega^2 \to 1/LC$, $|H| \to \infty$!



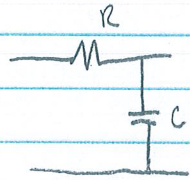
$|V_{out}/V_{in}|$
100
80
60
40
20
0
0
1000
2000
3000
4000
5000
Phase (degrees)
100
50
0
−50
−100
0
1000
2000
3000
4000
5000
Frequency ω (rad/sec)

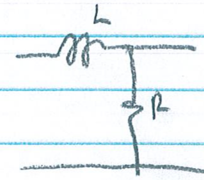
$\boxed{10.66}$ $10\cos(\omega t)$



At $\omega = 2000$, $V(t) = 7.07\,v$. Low-pass filter, so can be RC or RL:

$R = 10\,\Omega$ given.





$$\frac{V_o}{V_{in}} = \frac{\frac{1}{j\omega C}}{\frac{1}{j\omega C} + R} = \frac{1}{1 + j\omega RC}$$

$$\frac{V_o}{V_{in}} = \frac{R}{R + j\omega L}$$

$$\left|V_o/V_{in}\right| = \frac{1}{\sqrt{1 + \omega^2 (RC)^2}}$$

$$\left|V_o/V_{in}\right| = \frac{R}{\sqrt{R^2 + \omega^2 L^2}}$$

with $\omega = 2000$, $V_o/V_{in} = .707$, $R = 10$:

$$.707 = \frac{1}{\sqrt{1 + 2000^2 (10^2) C^2}}$$

$$.707 = \frac{10}{\sqrt{10^2 + 2000^2 L^2}}$$

$$1 + 4\times10^8\, C^2 = 2$$

$$100 + 2000^2 L^2 = 200$$

$$\boxed{C = 50\,\mu F}$$

$$\boxed{L = 5\,mH}$$