

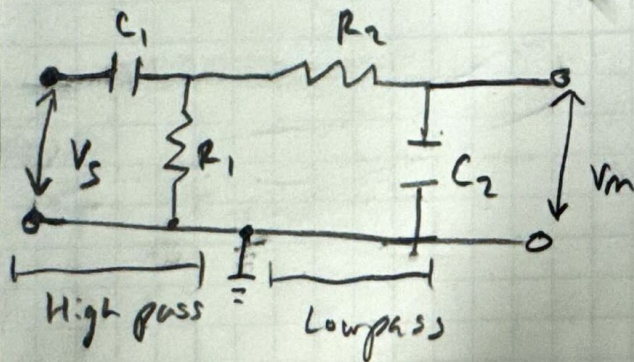
### Question 18

Band pass filter

$$500 \text{ Hz} < f < 50 \text{ kHz}$$

↑ High pass limit

↑ Low pass limit



Note when

$f = f^*$  in either case.

$$\boxed{G_{dB} = -3 \text{ dB}}$$

Low pass

$$f_{cutoff}^* = 50 \text{ kHz}$$

$$f^* = \frac{1}{2\pi RC} \rightarrow RC = \frac{1}{2\pi f^*} = 3.183 \cdot 10^{-6}$$

$$\boxed{R_2 = 1 \Omega \quad C_2 = 3.183 \mu\text{F}}$$

High pass

$$f_{high}^* = 500 \text{ Hz}$$

$$f_{high}^* = \frac{1}{2\pi RC} \rightarrow RC = 3.183 \cdot 10^{-3}$$

$$\boxed{R_1 = 100 \Omega \quad C_1 = 3.183 \mu\text{F}}$$