

- 14.57** For the filter in Fig. P14.57, choose the values of C_1 and C_2 to place poles at $s = -2$ and $s = -5$ rad/s.

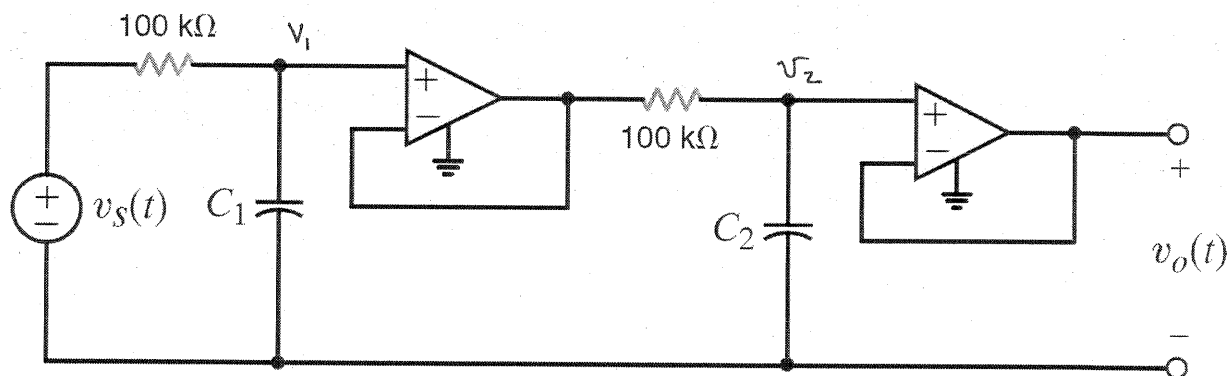
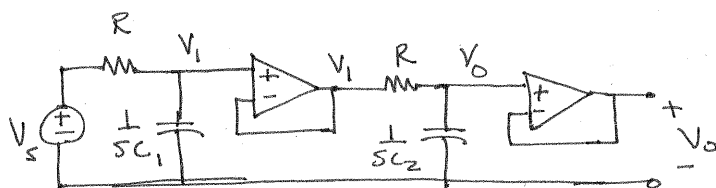


Figure P14.57

SOLUTION:



$$R = 100 \text{ k}\Omega$$

Both op-amps in unity gain configuration!

$$\frac{V_1}{V_s} = \frac{1/sC_1}{R + 1/sC_1} = \frac{1}{sC_1 R + 1} = \frac{1/RC_1}{s + 1/RC_1}$$

$$\frac{V_o}{V_1} = \frac{1/RC_2}{s + 1/RC_2} \quad \frac{V_o}{V_s} = \frac{1}{R^2 C_1 C_2 (s + \frac{1}{RC_1})(s + \frac{1}{RC_2})}$$

$$\frac{1}{RC_1} = 2 \quad \& \quad \frac{1}{RC_2} = 5 \quad \Rightarrow \quad \boxed{\begin{array}{l} C_1 = 5 \mu\text{F} \\ C_2 = 2 \mu\text{F} \end{array}}$$