Ch 471 Homework
Ch 5 Skoog

5-6. signal = 0.9×10^{-15} A

noise $\approx$ 0.3×10^{-15} A

$$S/N = \frac{0.9}{0.3} = 3$$

5-8. signal = average = 1.44

noise = σ = 0.271

(a) $$S/N = \frac{1.44}{0.271} = 5.3$$

(b) $$\frac{5.31}{\sqrt{8}} = \frac{10}{\sqrt{N}}$$ $\sqrt{N} = 5.33$ or

$N = (5.33)^2 = 28$ measurements

5-9. $$\text{thermal noise} = \sqrt{4kTR\Delta f} = \sqrt{4\left(1.38 \times 10^{-23}\frac{J}{K}\right)(298K)(10^6\,\Omega)(10^6\,Hz)}$$

$= 1.3 \times 10^{-4}$ V $= 130\,\mu V$

for $\Delta f = 100$ Hz, noise reduced by $\sqrt{\frac{100\,Hz}{10^6\,Hz}} = \frac{1}{100}$