ENGR 301 Assignment 3 solution

3-1 Price now = \$89,500 (207.6/163.6) = \$113,570.90 (\$113,000 is closest)

3-2 $E_2 = 28.6 = k\ 2^s$ and $E_3 = 28.2 = 3^s$

$$\frac{E_2}{E_3} = \frac{28.6}{28.2} = \left(\frac{2}{3}\right)^s \quad or \quad \ln\left(\frac{28.6}{28.2}\right) = s\ln\left(\frac{2}{3}\right) \quad or \quad s = \frac{0.014085}{-0.40547} = -0.03474$$

$k = 28.6/2^s = 28.6/2^{-0.03474} = 29.3$ hours

$E_{50} = 29.3 * 50^{-0.03474} = 25.6$ hours (25.5 is closest)

3-3 $^{(\$5{,}350 - \$5{,}000)}/_{(0.08 \times \$5{,}000)} = {}^{\$350}/_{\$425} = 0.875$ years = 10.5 months (10.5 is closest)

3-4 P = \$1400 (P/F, 10%, 1) + \$1,320 (P/F, 10%, 2) + \$1,240 (P/F, 10%, 3) + \$1,160 (P/F, 10%, 4) + \$1,080 (P/F, 10%, 5)
= \$1,272.73 + \$1,090.91 + \$931.63 + \$792.30 + \$670.60
= \$4,758.16 (\$4758 is closest)

3-5 F = \$1400 (F/P, 10%, 4) + \$1,320 (F/P, 10%, 3) + \$1,240 (F/P, 10%, 2) + \$1,160 (F/P, 10%, 1) + \$1,080
= \$2,049.74 + \$1,756.92 + \$1,500.40 + \$1,276.00 + \$1,080.00
= \$7,663.06 or F = P (F/P, 10%, 5) (\$7660 is closest)

3-6 Q_3 = \$1400 (F/P, 10%, 2) + \$1,320 (F/P, 10%, 1) + \$1,240 + \$1,160 (P/F, 10%, 1) + \$1,080 (P/F, 10%, 2)
= \$1,694.00 + \$1,452.00 + \$1,240 + \$1,054.55 + \$892.56
= \$6,333.11 or Q_3 = P (F/P, 10%, 3) (\$6157 is closest)

3-7 We could calculate $Q_6 = P\ (F/P,4\%,6)$, where P = \$70
and then use $Q_{10} = Q_6\ (F/P, 4\%, 4)$ (1)
or directly $Q_{10} = P\ (F/P, 4\%, 10)$ where P = \$70 (2)

Since P is given and Q_6 is not, we can find Q_{10} directly by solving (2),
$Q_{10} = \$70\ (1 + 0.04)^{10}$
= <u>\$103.62</u> (\$103 is closest)

3-8 Given: F = \$125,000, n = 5 and i = 12% = 0.12

Solve for P using: $P = F/(1 + i)^n$ or $P = F\ (1 + i)^{-n}$

$P = \$125{,}000\ (1 + 0.12)^{-5} = \$125{,}000\ (0.567427) = \$70{,}928$ (\$70,235 is closest)