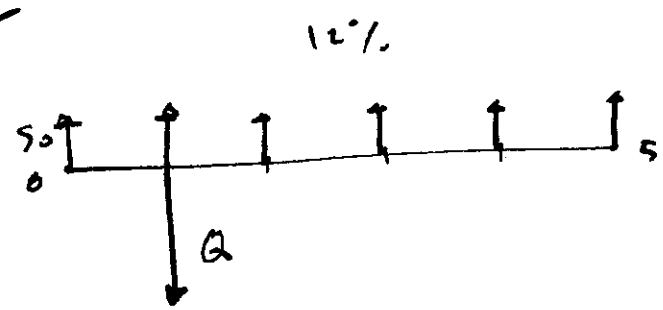
ENMG 600 Summary

Chapter 5 Homework solution

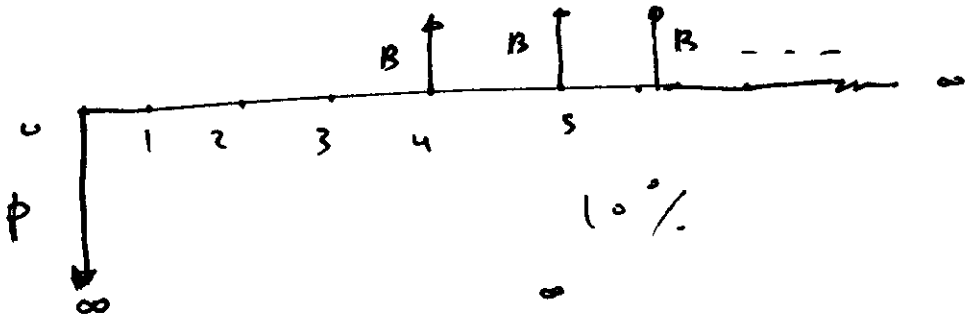
(4)



$$50 + 50(P|A, 12\%, 5) = \frac{Q}{1.12}$$

$$\Rightarrow 50(1 + 3.605) = \frac{Q}{1.12} \Rightarrow Q = \boxed{257.85}$$

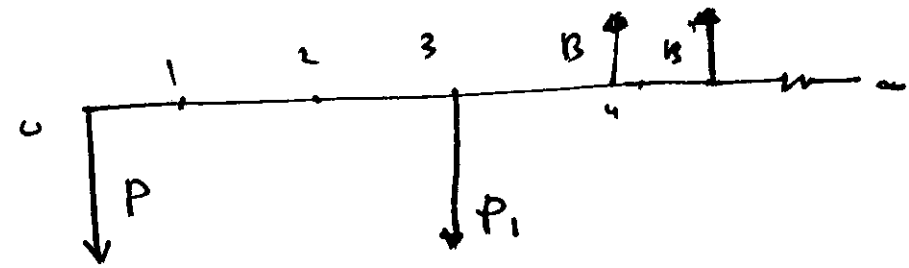
(8)



$$P = \sum_{n=0}^{\infty} \frac{B}{(1.1)^{n+4}} = \frac{B}{(1.1)^4} \sum_{n=0}^{\infty} \left(\frac{1}{1.1}\right)^n$$

$$= \frac{B}{(1.1)^4}\left[\frac{1}{1 - \frac{1}{1.1}}\right] = \frac{10B}{(1.1)^3}$$

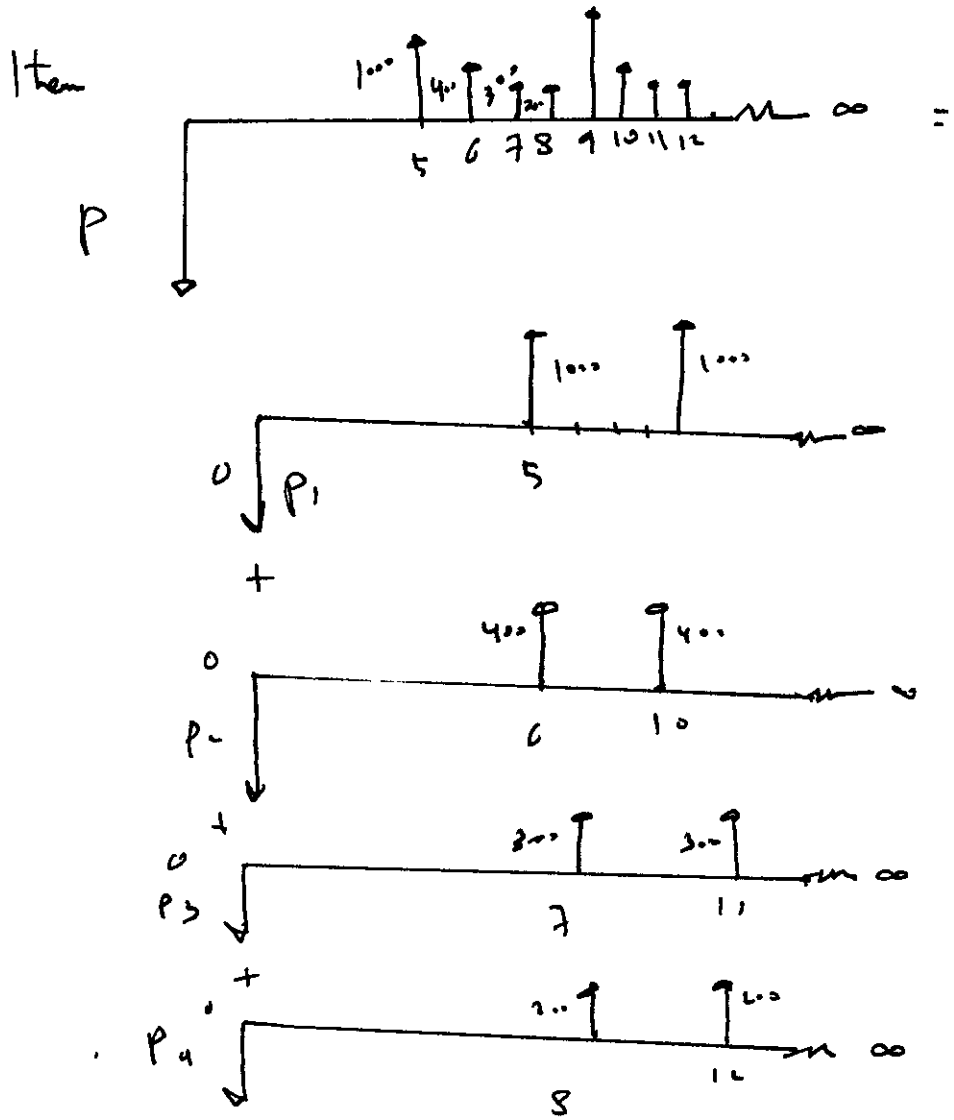
another way



$$P_1 = \frac{B}{i} = \frac{B}{0.1} = 10B$$

$$P = \frac{P_1}{(1.1)^3} = \frac{10B}{(1.1)^3}$$

(11) IF the figure is interpreted as repetitive (that it continues periodically every 4 years)



$$P = \frac{1000}{(1.08)^5} + \frac{1000}{(1.08)^9} + \cdots = \frac{1000}{(1.08)^5}\sum_{n=0}^{\infty}\left[\left(\frac{1}{1.08}\right)^4\right]^n + \frac{400}{(1.08)^6}\sum_{n=0}^{\infty}\left[\left(\frac{1}{1.08}\right)^4\right]^n$$

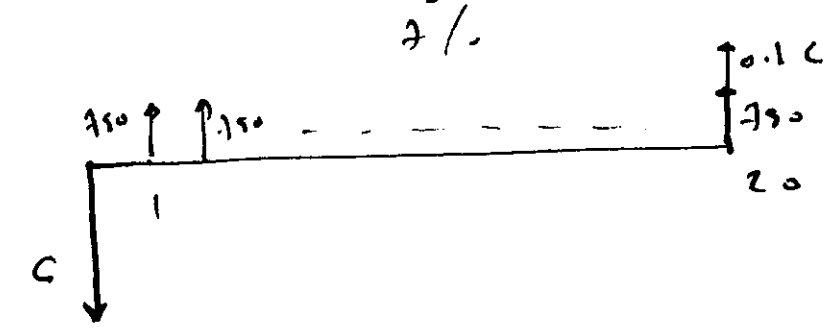
$$+ \frac{300}{(1.08)^7}\sum_{n=0}^{\infty}\left[\left(\frac{1}{1.08}\right)^4\right]^n + \frac{200}{(1.08)^8}\sum_{n=0}^{\infty}\left[\left(\frac{1}{1.08}\right)^4\right]^n$$

$$\text{Now } \left(\sum_{n=0}^{\infty}\left[\left(\frac{1}{1.08}\right)^4\right]^n\right) = \frac{1}{1-\left(\frac{1}{1.08}\right)^4} = 3.75$$

$$\Rightarrow P = 3.75\left[(1000)(0.7350) + (400)(0.6302) + (300)(0.5835) + (200)(0.5403)\right]$$

$$= \boxed{\text{\$ 4557}} \qquad (2)$$

(14)



$$PWB = 750(P|A, 7\%, 20) + 0.1C(P|F, 7\%, 20)$$

$$PWC = C$$

$$PWB = PWC$$

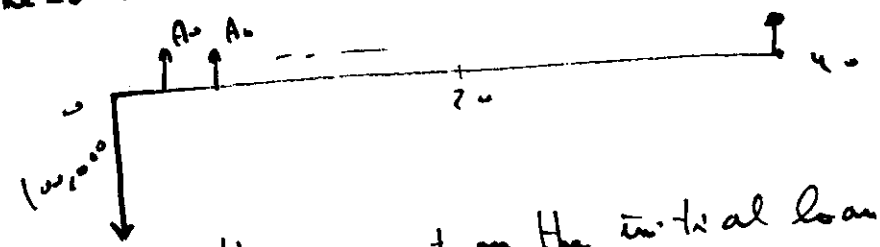
$$\Rightarrow \quad 750(10.594) + (0.1)(0.2584)C$$

$$= C$$

$$\Rightarrow \quad C = \frac{750(10.594)}{1 - (0.1)(0.2584)} = \boxed{\$8156}$$

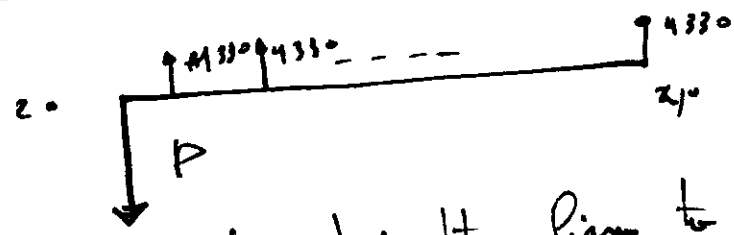
(24) 12% annual → 3% per quarter.

The Loan is to be repaid in 40 payments



Let A_0 be the payment on the initial loan.

$$A_0 = 100{,}000(A|P, 3\%, 40) = \boxed{\$4330}$$



the amount due by the firm to the insurance

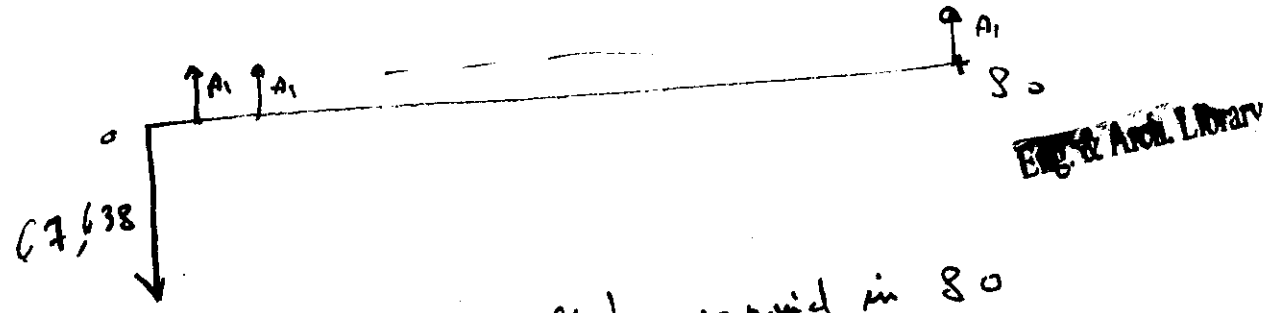
company after 5 years of the old or initial loan is:

$1.05\,P$ where P is the present worth of the remaining 20 payments.

$\Rightarrow$ amount due or balance $= (1.05)(4330)(P|A, 3\%, 20)$

$= \$67,638$

b)



the amount of $67,638 will be repaid in 80 payments. So $A_1 = 67,638\,(A|P, 2\%, 80)$

$= \$1701.$

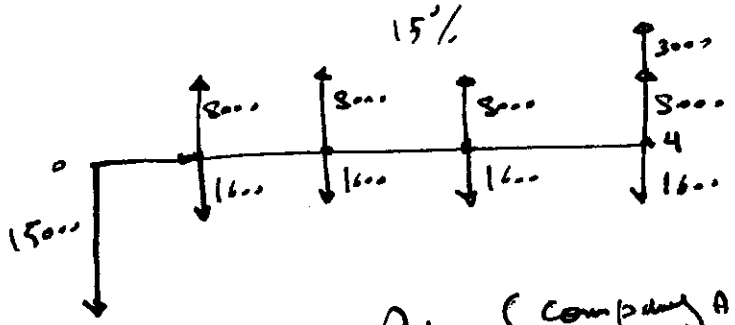
$\Rightarrow$ difference between old and new $= A_0 - A_1$

$= \boxed{\$2626}$

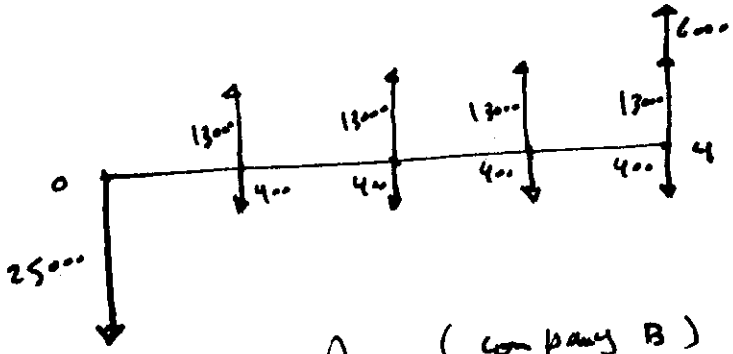
(43) Solved in class.

(54) Solved in class.

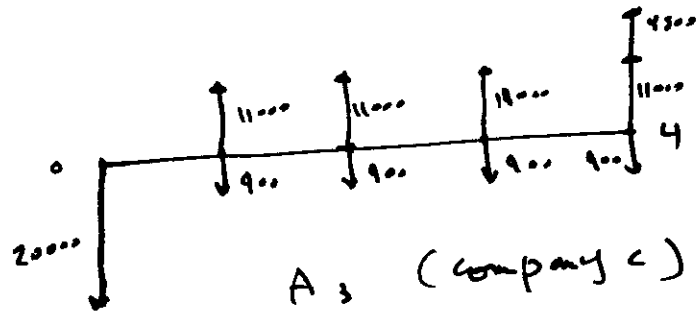
(5.9) The costs and benefits for the three offers is represented in the following cash flow diagrams.



A_1 (company A)



A_2 (company B)



A_3 (company C)

For A_1: $pwB_1 = 3000\,(P|A, 15\%, 4) + 3000\,(P|F, 15\%, 4) = 24,555$

$pwC_1 = 15000 + 1600\,(P|A, 15\%, 4) = 19568$

$NPW_1 =$ 4987

For A_2: $pwB_2 = 13000\,(P|A, 15\%, 4) + 6000\,(P|F, 15\%, 4) = 40,546$

$pwC_2 = 25000 + 400\,(P|A, 15\%, 4) = 26,142$

$NPW_2 =$ 14,404

For A_3: $pwB_3 = 11000\,(P|A, 15\%, 4) + 4500\,(P|F, 15\%, 4) = 31,66$

$pwC_3 = 20,000 + 900\,(P|A, 15\%, 4) = 22,570$

$NPW_3 =$ 9,092

$\text{Max}\{NPW_1, NPW_2, NPW_3\} =$ 14,402. $\Rightarrow$ (company B gives the best offer)