Answer Key

Engineering Economy

$$P = \frac{A}{i}\left[1-(1+i)^{-N}\right]$$

$$= \frac{\$12000}{0.10}\left[1-(1+0.10)^{-5}\right]$$

$$P = ₱45489.4412$$

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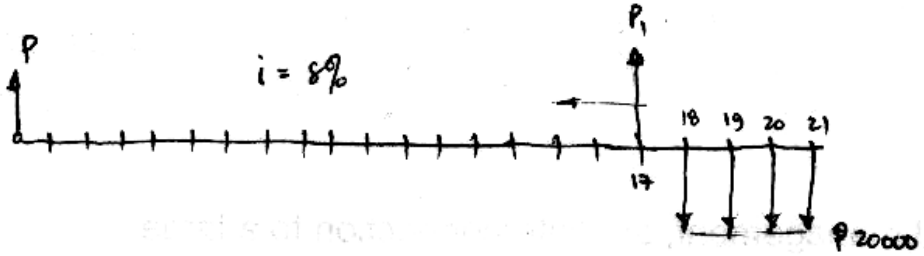


$$P_1 = \frac{A}{i}\left[1-(1+i)^{-N}\right]$$

$$= \frac{₱20000}{0.08}\left[1-(1+0.08)^{-4}\right]$$

$$P_1 = ₱66242.5368$$

And from;

$$P_1 = P(1+i)^7$$

$$₱66242.5368 = P(1+0.08)^{17}$$

$$P = ₱17903.3010$$

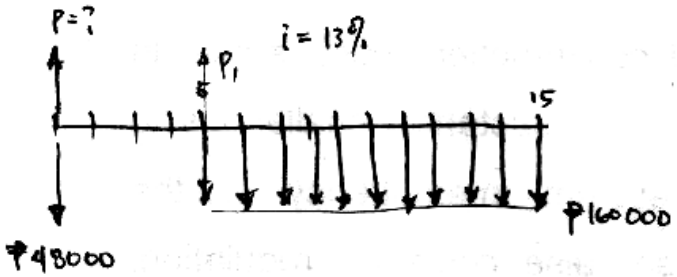
$P = ₱11000 - ₱1800$

$P = ₱9200$

$$P = \frac{A}{i}\left[1-(1+i)^{-N}\right]$$

$$₱9200 = \frac{₱965.25}{i}\left[1-(1+i)^{-15}\right]$$

$$i = 6.2894\%$$



$$P_1 = \frac{A}{i}\left[1 - (1+i)^{-N}\right]$$

$$= \frac{₱160000}{0.13}\left[1 - (1+0.13)^{-10}\right]$$

$$P_1 = ₱868198.9562$$

and;

$$P_1 = P(1+i)^n$$

$$₱868198.9562 = P(1+0.13)^4$$

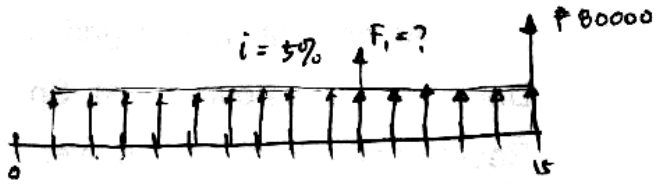
$$P = ₱532482.6792$$

Hence; the cash price of the property

$$P = ₱532482.6792 + ₱480000$$

$$\boxed{P = ₱1012482.679}$$

$F = (50\ \text{bonds})\left(₱1600/\text{bond}\right) = ₱80000$



$$F = \frac{A}{i}\left[(1+i)^N - 1\right]$$

$$₱80000 = \frac{A}{0.05}\left[(1+0.05)^{15} - 1\right]$$

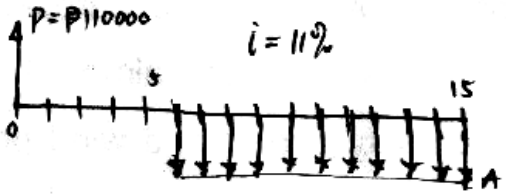
$$A = ₱3707.3830$$

Principal after at the end of 10th year

$$F_1 = \frac{A}{i}\left[(1+i)^N - 1\right]$$

$$F_1 = \frac{₱3707.3830}{0.05}\left[(1+0.05)^{10} - 1\right]$$

$$F_1 = ₱46631.0649$$



$$F = P(1+i)^n$$

$$= ₱110000(1+0.11)^5$$

$$F = ₱185356.3971$$

$$P = \frac{A}{i}\left[1-(1+i)^{-N}\right]$$

$$₱185356.3971 = \frac{A}{0.11}\left[1-(1+0.11)^{-N}\right]$$

$$A = ₱29864.8094$$

$$P = \frac{A}{i}\left[1 - (1+i)^{-N}\right]$$

$$₱28\,000 = \frac{A}{0.15}\left[1 - (1+0.15)^{-10}\right]$$

$$A = ₱5579.0578$$

$$P = \frac{A}{i}\left[1 - (1+i)^{-N}\right]$$

$$₱52\,500 = \frac{₱\,6\,600}{0.09}\left[1 - (1+0.09)^{-N}\right]$$

$$N = 14.6031 \text{ years}$$

$$F = \frac{A}{i}\left[(1+i)^N - 1\right]$$

$$₱80690 = \frac{₱5100}{i}\left[(1+i)^{10} - 1\right]$$

$$i = 9.8470\%$$

$$F = \frac{A}{i}\left[(1+i)^N - 1\right]$$

$$₱115000 = \frac{A}{0.13/4}\left[\left(1+\frac{0.13}{4}\right)^{(8)(4)} - 1\right]$$

$$A = ₱2096.4218$$

$$P = \frac{A}{i}\left[1+(1+i)^{-N}\right]$$

$$₱21{,}000 = \frac{A}{0.12}\left[1+(1+0.12)^{-12}\right]$$

$$A = ₱2005.2916$$

$$F = \frac{A}{i}\left[(1+i)^N - 1\right]$$

$$₱2000000 = \frac{A}{0.05}\left[(1+0.05)^{20} - 1\right]$$

$$A = ₱60485.17438$$

and; Amount at the bank after 15th year

$$F_{15} = \frac{A}{i}\left[(1+i)^N - 1\right] = \frac{₱60485.17438}{0.05}\left[(1+0.05)^{15} - 1\right]$$

$$F_{15} = ₱1305183.182$$

$$P = \frac{A}{i}\left[1-(1+i)^{-N}\right]$$

$$= \frac{₱1200}{0.07/6}\left[1-\left(1+\frac{0.07}{6}\right)^{-(10)(6)}\right]$$

$$P = ₱51572.4198$$

Hence; the amount at 12th year when compounded bi-monthly

$$F = P(1+i)^n$$

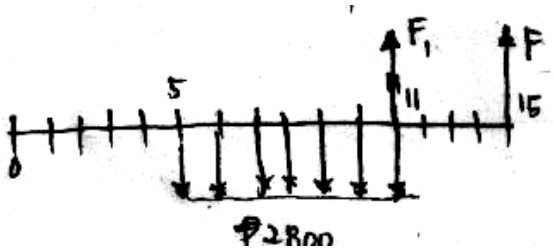
$$= ₱51572.4198\left(1+\frac{0.07}{6}\right)^{(12)(6)}$$

$$F = ₱118881.216$$

$$P = \frac{A}{i}\left[1-(1+i)^{-N}\right]$$

$$= \frac{₱\,11500}{0.08}\left[1-(1+0.08)^{-8}\right]$$

$$P = ₱\,66086.3479$$



$$F_1 = \frac{A}{i}\left[(1+i)^N - 1\right]$$

$$= \frac{₱2800}{0.15/4}\left[\left(1+\frac{0.15}{4}\right)^{6(4)} - 1\right]$$

$$F_1 = ₱105984.7172$$

and; total amount at the 15th year.

$$F = F_1(1+i)^N$$

$$= ₱105984.7172\left(1+\frac{0.15}{4}\right)^{(4)(4)}$$

$$F = ₱191008.6044$$

$$P = P_A + P_G$$

$$P_G = G\left\{\frac{1}{i}\left[\frac{(1+i)^n - 1}{i(1+i)^n} - \frac{n}{(1+i)^n}\right]\right\}$$

$$= \$500\left\{\frac{1}{0.08}\left[\frac{(1+0.08)^{10} - 1}{0.08(1+0.08)^{10}} - \frac{10}{(1+0.08)^{10}}\right]\right\}$$

$$P_G = \$12988.4157$$

$$P_A = \frac{A}{i}\left[1 - (1+i)^{-N}\right]$$

$$= \frac{\$6200}{0.08}\left[1 - (1+0.08)^{-10}\right]$$

$$P_A = \$41602.50467$$

Hence;

$$P = \$41602.50467 + \$12988.4157$$

$$\boxed{P = \$54590.9204}$$

$$F = \frac{A}{i}\left[(1+i)^N - 1\right]$$

$$\$210\,000 = \frac{A}{0.15}\left[(1+0.15)^5 - 1\right]$$

$$A = \$31146.2660$$

$$F = \frac{A}{i}\left[(1+i)^N - 1\right]$$

$$= \frac{\$250}{0.07/12}\left[\left(1+\frac{0.07}{12}\right)^{5(12)} - 1\right]$$

$$F = \$17898.2254$$