University of Asia Pacific

Assignment - 01

Course title: Buisness and Entrepreneurship.

Course code: BUS 401

Submitted to —

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Sec: A

Topic no. 1 :

Time value money: The time value of money is the concept that a sum of money is worth more now than the same sum will be at a future date due ~~to~~ to it's earnings potential in the interim. The time value of money is also referred to as present discounted value.

For example, say ~~you~~ 9 have the chance of receiving 10000tk now or 10000 tk two years from now. Despite the equal face value, 10000 tk today has more value and utility than it will two years from now due to the opportunity costs associated with the delay. In other words we can say, a payment delayed is an opportunity missed.

The rational for incorporating time value of money in financial decisions :

The recognition of the time value of money is extremely significant in financial decisions making because, most of financial decisions such as the acquisition of assets or procurement of funds, affect firms cash flows in different time periods, for example if a fixed asset is purchased, it will require an immediate cash outlays and will affect cash flows during many future periods.

Similarly if the firm borrows funds from a bank or from anyother sources, it receives cash now ~~now~~ and commits an obligation to pay interest and return principal sum in future. While taking decisions on these matteris, the financial management, must keep the time factor in mind. If the timing of cash is not considered, the firm may make decisions which may falter it's objective of maximizing the owner's welfare.

Techniques of compounding and discounting:

If the interest is compounded, that means the interest which is earned at the end of year, will be added to principal and will go on till the end of time. Future values are calculated by using this compounding interest.

As interest rates increases, compounding interest also increases that means if you want large sum of money, interest rates must be high. So, when investors were investing, they should look for higher interest rate to get high returns in this method.

General Formula: $FV_n = PV\,(1+r)^n$

Here,

$1+r$ = future value interest factor

PV = initial cash flow

r = rate of interest

n = number of years.

this formula also used in discounting. Now I will discuss about discounting techniques.

Discounting is the process of determining present value of a series of future cash flows. Present value of a future cash flow is the current worth of a future sum of money ~~of~~ or stream of cash flow given a specified rate of return. Present value is also called discounted value. Interest rate used for discounting cash flows is also called the discount rate

General formula used.

$$FV_n = PV(1+r)^n$$

Topic no. 02 :

P5-4 :

~~For case~~

future value for case,

we know,

~~Ans~~ $FV = PV * (1+r)^n$

Here, ~~PV → present cash value~~

PV = initial cash flow

n = number of years

r = rate of interest

$= \frac{?\%}{100} = ?$

For, A →

$FV = 200 * (1+0.05)^{20}$

$= \$ 530.66$

B → $FV = 4500(1+0.08)^7$

$= \$ 7712.21$

C → $FV = 10000(1+0.09)^{10}$

$= \$ 23673.64$

D → $FV = 25000(1+0.1)^{12}$

$= \$ 78460.71$

P.T.O.

E → $FV = 37000(1+0.11)^5$
$= \$62347.15$

F → $FV = 40000(1+0.12)^9$
$= \$110923.15$.

Ans.

P5-6:

a) Car value or price after 5 years if inflation is

(i) 2% then, $FV = 14000(1+0.02)^5$
$= \$15457.13$

(ii) 4% then, $FV = 14000(1+0.04)^5$
$= \$17033.14$

b) The car will cost $1576.01 more with a 4% inflation rate than rate with 2%. This increase is 10.2% more than would be paid with only a 2% rate of inflation.

c) ~~future~~ car price ~~of~~ if inflation is 2% for next 2 years

$FV_2 = PV(1+r)^n$
$= 14000(1+0.02)^2$
$= \$14565.60$

and 4% for 3 years after that.
Price rise at end of 5th year

$FV_5 = 14565.60(1+0.04)^3$
$= \$16384.32$.

P5-8 :

1) River Bank's savings account with an interest rate of 10.8% compounded monthly.

$r = 10.8\% = \frac{0.108}{12}$

$FV = \$70000$

$PV = \$3000$

2) $FV = PV(1+r)^n$

$\Rightarrow 70000 = 3000(1 + \frac{0.108}{12})^{12n}$

$\Rightarrow \cancel{1.009^{12n} = 23.333}$

$\Rightarrow 1.009^{12n} = \frac{70000}{3000}$

$\Rightarrow 1.009^{12n} = 23.333$

taking ~~log both~~. ln both side

$\Rightarrow 12n \ln 1.009 = \ln 23.333$

$\Rightarrow 12n = \cancel{\frac{\ln 23.333}{\ln 1.009}} \frac{\ln 23.333}{\ln 1.009}$

$\Rightarrow n = 29.3$ years.

2) First state bank's with 11.5% interest compounded annually.

$r = 0.115$

Same as (1)

$70000 = 3000(1 + 0.115)^n$

$\Rightarrow 1.115^n = 23.333$

$\Rightarrow n \ln 1.115 = \ln 23.333$

$\Rightarrow n = \frac{\ln 23.333}{\ln 1.115}$

$\therefore n = 28.94$ years.

P.T.O.

(3) Union bank's with 9.3 % interest rate compounded weekly

$r = ~~90~~ \frac{0.093}{52}$

$70000 = 3000\left(1+\frac{0.093}{52}\right)^{52n}$

$\Rightarrow 1.001788462^{52n} = 23.333$

$\Rightarrow 52n \ln 1.001788462 = \ln 23.333$

$\Rightarrow 52n = \frac{\ln 23.333}{\ln 1.001788462}$

$\therefore n = 33.90$ years.

Ans.

P5 – 10 :

Present value calculation.

present value of \$1 = FV

$PV = \frac{1}{(1+i)^n}$

for.

A . $PV = \frac{1}{(1+0.02)^4}$ $r = 0.02, n = 4$

$= \$0.9238$

B $PV = \frac{1}{(1+0.1)^2}$ $r = 0.1, n = 2$

$= \$0.8264$

C $PV = \frac{1}{(1+0.05)^3}$ $r = 0.05, n = 3$

$= \$0.8638$

D $PV = \frac{1}{(1+0.13)^2}$ $r = 0.13, n = 2$

$= \$0.7831$

Ans.

P5-14:

Received at the end of year \$30000 = PV
one year from now, so $n = 4$
interest rate, $r = 15\% = 0.15$

$$FV = 30000(1+0.15)^4$$
$$= \$52470.19$$

So, interest received = (52470.19 - 30000)
= \$ 22470.19

Amount required, \$210000
so, future value = 210000 - 52470.19
= \$ 157529.81 = FV

$r = 0.15$
$n = 5$

So,
$$PV = \frac{FV}{(1+0.15)^5}$$

$$= \$\ 78319.75$$

∴ Present value \$78319.75.

Ans.

P5-15:

(a) The least ~~you~~ I will sell my claim -

(1) $n = 10$; $r = 0.06$; $FV = \$1000000$

$$PV = \frac{FV}{(1+r)^n} = \frac{1000000}{(1+0.06)^{10}} = \$558394.78$$

(2) ~~Par~~ $r = 0.09$

$$PV = \frac{1000000}{(1+0.09)^{10}} = \$422410.81$$

(3) $r = 0.12$

$$PV = \frac{1000000}{(1+0.12)^{10}} = \$321973.24$$

(b) same ~~fo~~ as for 15 years period

(1) $n = 15$; $r = 0.06$; $FV = \$1000000$

$$PV = \frac{1000000}{(1+0.06)^{15}} = \$417265.06$$

(2) $r = 0.09$

$$PV = \frac{1000000}{(1+0.09)^{15}} = \$274538.04$$

(3) $r = 0.12$

$$PV = \frac{1000000}{(1+0.12)^{15}} = \$182696.26$$

(c) As the discount rate increase, the present value becomes smaller. This decrease is due to the higher opportunity cost associated with the higher rate.

P.T.O.

Also the longer the time untill the lottery payment is collected, the less the present value due to the greater time over which the opportunity cost applies. In other words, the larger the discount rate and the longer the time untill the money is received, the smaller will be the present value of a future payment.

P5-17:

A) $n = 5$; $r = 10\% = 0.1$; $FV = \$30000$

$$PV = \frac{30000}{(1+0.1)^5} = \$18627.64$$

B) $n = 20$, $r = 0.1$, $FV = \$3000$

$$PV = \frac{3000}{(1+0.1)^{20}} = \$445.93$$

C) $n = 10$, $r = 0.1$, $FV = \$10000$

$$PV = \frac{10000}{(1+0.1)^{10}} = \$3855.43$$

D) $n = 40$, $r = 0.1$, $FV = \$15000$

$$PV = \frac{15000}{(1+0.1)^{40}} = \$331.42$$

$\Longrightarrow$

Tom should purchase option A and C and ~~not do~~ shouldn't purchase option B and D.

P5-20:

a) Present value of an ordinary annuity vs annuity due

① Ordinary Annuity

② Annuity Due

PMT = Annuity payment

r = Interest rate

n = number of periods/years

$$PV = PMT\left[\left(1-\left(\frac{1}{(1+r)^n}\right)\right)/r\right]$$

A $n = 3$, $r = 0.07$, PMT = \$12000

$$PV = \overset{PMT}{\cancel{12000}}\left[\frac{\left(1-\frac{1}{(1+r)^n}\right)}{r}\right]$$

$$= 12000\left[\frac{\left(1-\frac{1}{(1+0.07)^3}\right)}{0.07}\right] = \$31491.79$$

\$31491.79 × 1.07
= \$33696.22

B $n = 15$, $r = 0.12$, PMT = \$55000

$$PV = 55000\left[\frac{\left(1-\frac{1}{(1+0.12)^{15}}\right)}{0.12}\right] = \$374597.55$$

\$374597.55 × 1.12
= \$419549.25

C $n = 9$, $r = 0.2$, PMT = \$700

$$PV = 700\left[\frac{\left(1-\frac{1}{(1+0.2)^9}\right)}{0.2}\right] = \$2821.68$$

\$2821.68 × 1.20
= \$3386.02

D $n = 7$, $r = 0.05$, PMT = 140000

$$PV = 140000\left[\frac{\left(1-\frac{1}{(1+0.05)^7}\right)}{0.05}\right] = \$810092.28$$

\$810092.28 × 1.05
= \$850596.89

E $n = 5$, $r = 0.1$, PMT = \$22500

$$PV = 22500\left[\frac{\left(1-\frac{1}{(1+0.1)^5}\right)}{0.1}\right] = \$85292.70$$

\$85292.70 × 1.1
= \$93821.97

P.T.O.

(b) The annuity due results in a greater present value in each case. By deposting the payment at the beginning rather than at the end of the year, it has one less year to discount back.

P5-22 :

a) $n = 40$; $r = 10\% = 0.1$; PMT = \$2000

$$FV = \frac{PMT}{r}\left[(1+r)^n - 1\right]$$

$$FV = \frac{2000}{0.1}\left[(1+0.1)^{40} - 1\right] = \$885185.11$$

b) $n = 30$, $r = 0.1$; PMT = \$2000

$$FV = \frac{2000}{0.1}\left[(1+0.1)^{30} - 1\right] = \$328988.05$$

c) By delaying the deposits by 10 years the total opportunity cost is \$556,197. The difference is due to both the lost deposits of \$20000 (\$2000 x 10 years) and the lost compounding of interest on all of the money for 10 years.

d) Annuity due for

a) \$885185.11 x 1.10 = \$973703.62

b) \$328988.05 x 1.10 = \$361886.85

Both deposits increased due to the extra year of compounding from the beginning of year deposits instead of the end of year deposits. However, the incremental change in the 40-year annuity is much larger than the incremental compounding on 30 year deposit, due to the larger sum on which the last year of compounding occurs.

P5-24 :

a) $n = 30$, $r = 11\% = 0.11$, PMT = \$20000

$$PV = 20000\left[\frac{\left(1 - \frac{1}{(1+0.11)^{30}}\right)}{0.11}\right] = \$173875.84$$

b) $n = 20$, $r = 9\% = 0.09$, ~~At~~ FV = \$173875.84 ⇒ annuity payout

$$PV = \frac{FV}{(1+i)^n} = \frac{173875.84}{(1+0.09)^{20}} = \$31024.82$$

c) Both values would be lower. In other words we can say. a smaller sum would be needed in 20 years for the annuity and a smaller amount would have to be put away today to accumulate the needed future sum.

d) $n = 30$, $r = 0.1$, PMT = \$20000

$$PV = 20000\left[\frac{\left(1 - \frac{1}{(1+0.1)^{30}}\right)}{0.1}\right] = \$188538.29$$

then , FV = \$188538.29 .

$$PV = \frac{188538.29}{(1+0.1)^{30}} = \$28025.02$$

More money will be required to support the \$20000 annuity in retirement, because initial amount will earn 1% less per year. However, more less money will have to be deposited during the next 20 years, because the return on saved finds will be 1% higher.

P5- 25 :

a) $n = 25$, $r = 5\% = 0.05$, $PMT = \$40000$

$$PV = \cancel{PMT}\ 40000 \left[\frac{\left(1 - \frac{1}{(1+0.05)^{25}}\right)}{0.05} \right] = \$563757.78$$

at 5% taking award as annuity is better I think, because the present value is \$ 563760, compared to receiving \$ 500000 as future value. One has to live at least 23.5 years (~~25~~ $25 - \frac{563757.78}{40000}$) to benefit more from the annuity stream of payments.

(b)

$r = 0.07$

$$PV = 40000 \left[\frac{\left(1 - \frac{1}{(1+0.07)^{25}}\right)}{0.07} \right] = \$466143.33$$

at 7% lump sum is better. This is why my decision will be changed. and also here, the present value of the annuity is only \$ 466143.33.

(c)

As an investment \$ 500000 to get a 25 years annuity of \$40000. The discount rate,

~~N=~~ $n = 25$, $PV = -\$500000$, $PMT = \$40000$

$I = 6.24\%$.

P5 – 26:

Present value of each perpenty :

case :	formula :	Present value:
A	$\frac{\text{annual amount}}{\text{discount rate}} = \frac{20000}{0.08}$	\$250000
B	$\frac{100000}{0.1}$	\$ 1000000
C	$\frac{3000}{0.06}$	\$50000
D	$\frac{60000}{0.05}$	\$1200 000

P5 – 27:

(a) $PV = \frac{CF}{r}$

PV = Present value of cash flow

CF = annual cash flow = \$600

r = discount rate = 6% = 0.06

$PV = \frac{600}{0.06} = \$10000$

for 3 students marlais parents required to make the payments of \$ 30000.

(b)

$PV = \frac{600}{0.09}$; r = 0.09

= \$6666.67

for 3 students marla's parent is required to make the payments of \$ 20000.

15

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P5-31:

(a) PV of a mixed stream cash flow of A : Here, $i = 0.15$

PV. "

$$= C_1 \times (1+i)^{-1} + C_2 \times (1+i)^{-2} + C_3 \times (1+i)^{-3} + C_4 \times (1+i)^{-4} + C_5 (1+i)^{-5}$$

$$= 50000(1+0.15)^{-1} + 40000 \times (1+0.15)^{-2} + 30000(1+0.15)^{-3} + 20000(1+0.15)^{-4} + 10000(1+0.15)^{-5}$$

$$= \$\ 109856.33$$

for B

$$= 10000(1+0.15)^{-1} + 20000(1+0.15)^{-2} + 30000(1+0.15)^{-3} + 40000(1+0.15)^{-4} + 50000(1+0.15)^{-5}$$

$$= \$\ 91272.98$$

(b) Cash flow stream A, with a present value of 109856.33 $ ~~109.890~~ is higher than cash flow stream B's present value of 91292.98 because the larger cash inflows occur in A in the early years when their present value is greater, while the smaller cash flows are received further in the future.

P5-33:

(a) r. $i = 8\% = 0.08$

PV of mixed stream $= 5000(1+0.08)^{-1} + 4000(1+0.08)^{-2} + 6000(1+0.08)^{-3} + 10000(1+0.08)^{-4} + 3000(1+0.08)^{-5}$

$= \$22214.03$, this amount of deposit needed to fund the shortfall.

P.T.O.

(b)

An increase in the earnings rate would ~~rep~~ reduce the amount calculated in part a. The higher pate would lead to a larger interest income being earned each year on the investment. The larger interest amounts will permit a decrease in the initial investment to obtain the same future value avaible for ~~convertin~~ covering the shortfall.

P5-37 :

(a) compounding frequency

~~A~~ ~~FV~~

for, A $n=10$, $r=0.03$, $PV=\$2500$

$FV = PV(1+r)^n = 2500(1+0.03)^{10} = \$3\cdot359.79$

B $n=18$, $r=0.02$, $PV=\$50000$

$FV = 50000(1+0.02)^{18} = \$71412.37$

C $n=10$, $r=0.05$, $PV=\$1000$

$FV = 1000(1+0.05)^{10} = \$1628.89$

D $n=24$, $r=0.04$, $PV=\$20000$

$FV = 20000(1+0.04)^{24} = \$51226.08.$

P.T.O.

(b) Effective interest rate, $i_{eff} = (1 + r/m)^m - 1$

for, A $\quad i_{eff} = (1 + \frac{0.06}{2})^2 - 1 = (1 + 0.03)^2 - 1 = 1.061 - 1 = 0.061$

$= 6.1\%$

B $\quad i_{eff} = (1 + \frac{0.12}{6})^6 - 1 = (1 + 0.06)^6 - 1 = 1.126 - 1 = 0.126 = 12.6\%$

C $\quad i_{eff} = (1 + \frac{0.05}{1})^1 - 1 = 1.05 - 1 = 0.05 = 5\%$

D $\quad i_{eff} = (1 + \frac{0.16}{4})^4 - 1 = (1 + 0.04)^4 - 1 = 1.17 - 1 = .17 = 17\%$

(c) The effective rates of interest rise relative to the stated nominal rate with increasing compounding frequency.

P5–41:

(a) ① annual:

$n = 10, \ r = 0.08, \ PMT = \$300$

$$FV = \frac{PMT}{r}\left[(1+r)^n - 1\right] = \frac{300}{0.08}\left[(1 + 0.08)^{10} - 1\right]$$

$= \$4345.97$

② semiannual:

$n = 10 \times 2 = 20, \ r = 8\%/2 = 4\% = 0.04, \ PMT = \frac{\$300}{2} = \$150$

$$FV = \frac{150}{0.04}\left[(1 + 0.04)^{20} - 1\right] = \$4466.71$$

③ Quarterly:

$n = 10 \times 4 = 40, \ r = 8\%/4 = 2\% = 0.02,$

$PMT = \frac{\$300}{4} = \$75$

$$FV = \frac{75}{0.02}\left[(1 + 0.02)^{40} - 1\right] = \$4530.15$$

(b)
The earlier a deposit is made the earlier the funds will be available to earn interest and contribute to compounding. Thus the earlier the deposit and the more frequent the compounding, the larger the future sum will be.

P5-43:

The annual deposit must be,

(a)

$n = 42,\ r = 8\% = 0.08,\ FV = \$220000$

$$PMT = \frac{FV \times r}{(1+r)^n - 1} = \frac{220000 \times 0.08}{(1+0.08)^{42} - 1} = \$723.10$$

(b)

$n = 42,\ r = 0.08,\ PMT = \$600$

$$FV = \frac{PMT}{r}\left[(1+r)^n - 1\right]$$

$$= \frac{600}{0.08}\left[(1+0.08)^{42} - 1\right] = \$182546.11$$

this amount we have accumulated by the end of the 42nd year.

P5-44:

(a)

Given loan $= \$21600 = PV$

$r = 10\% = 0.1$

$n = 1$

$FV = PV(1+0.1)^1$

$= \$23760$

My friend gave me \$21600 by 10% and if so I have to pay \$23760 but asked me to pay \$24000. So he hasn't charged 10% interest.

P.T.O.

(b) Accural interest rate :

Here,

PV = \$21600 given money

FV = \$ 24000 have to pay after 1 year

$n = 1$

So,

$$FV = PV(1+r)^n$$

$$\Rightarrow (1+r)^n = \frac{FV}{PV}$$

$$\Rightarrow 1+r = \left(\frac{FV}{PV}\right)^{\frac{1}{n}}$$

$$\Rightarrow r = \left(\frac{FV}{PV}\right)^{\frac{1}{n}} - 1$$

$$\Rightarrow r = \left(\frac{24000}{21600}\right)^{1/1} - 1$$

$$\Rightarrow r = 1.11 - 1$$

$$\Rightarrow r = 0.1111$$

$$\therefore r = 11.11\%$$

So the accural interest my friend charged is 11.11%.

P5-46:

(a) $n = 25$, $r = 5\% = 0.05$, PV = \$ 200000

$$FV = PV(1+r)^n = 200000(1+0.05)^{25} = \$677270.99$$

(b) $n = 25$, $r = 9\% = 0.09$, FV = \$ 677270.99

$$PMT = \frac{FV \times r}{(1+r)^n - 1} = \frac{677270.99 \times 0.09}{(1+0.09)^{25} - 1} = \$ 7996.03$$

P.T.O.

(c) Since John will have an additional year on which to earn interest at the end of the 25 years, his annuity due deposit will be smaller each year. To determine the annuity amount, John will first discount back the \$ 677270.99 one period.

$n = 1,\ r = 0.09,\ FV_{25} = \$677270.99$

so for, $PV = \frac{FV}{(1+r)^n} = \frac{677270.99}{(1+0.09)^{25}} = \$621349.53$

this is the amount John must accumulate over the 25 years. John can solve for ~~the~~ his annuity amount using the same calulation as in part b.

$n = 25,\ r = 0.09,\ FV = 621349.53$

for, $PMT = \frac{FV \times r}{(1+r)^n - 1} = \frac{621349.53 \times 0.09}{(1+0.09)^{25} - 1} = \$7335.80$

to check this value, multiply the annual payment by 1 pluss the 9% discount rate.

so, $\$7335.80 \times 1.09 = \$7996.03$.

Ans.

P5-56:

(a) The present value of Dealer A's offer is:

$$PV = \$2000 \times \frac{\left(1 - \frac{1}{(1+\frac{0.06}{12})^{24}}\right)}{\frac{0.06}{12}}$$

$= \$45125.73$

B's offer

$$PV = \$10000 + \$1500 \times \frac{\left(1 - \frac{1}{(1+\frac{0.06}{12})^{24}}\right)}{\frac{0.06}{12}}$$

$= \$43844.29$.

Da

P.T.O.

So, Dealer B offers me the cheapest financing.

(b)

If dealer A's offer same with dealer B's:

$$\$10000 + \$1500 \times \frac{\left(1 - \frac{1}{(1+\frac{r}{12})^{24}}\right)}{\frac{r}{12}} = \$2000 \times \frac{\left(1 - \frac{1}{(1+\frac{r}{12})^{24}}\right)}{\frac{r}{12}}$$

$$\Rightarrow \$10000 = \$500 \times \frac{\left(1 - \frac{1}{(1+\frac{r}{12})^{24}}\right)}{\frac{r}{12}}$$

By using financial calculator I solved the equation. and $r = 18.15\%$.

So, the interest will be 18.15% if the financing cost from Dealer A was equal to that of Dealer B.

P5 - 53:

~~In P5 44~~

from P5–44(b), $r = \left(\frac{FV}{PV}\right)^{\frac{1}{n}} - 1$

(a)

for A . $n = 6$, $PV = \$5000$, $FV = \$8400$

$$r = \left(\frac{8400}{5000}\right)^{\frac{1}{6}} - 1 = 9.03\%$$

B . $n = 15$, $PV = \$5000$, $FV = \$15900$

$$r = \left(\frac{15900}{5000}\right)^{\frac{1}{15}} - 1 = 8.02\%$$

C . $n = 4$, $PV = \$5000$, $FV = \$7600$

$$r = \left(\frac{7600}{5000}\right)^{\frac{1}{4}} - 1 = 11.04\%$$

D $n = 10$, $PV = \$5000$, $FV = \$13000$

$$r = \left(\frac{13000}{5000}\right)^{\frac{1}{10}} - 1 = 10.03\%$$

(b).

Investment .C provides the highest return of the four alternatives. Assuming equal risk for the alternatives, Clare should choose C according to my calculation.

P5-56:

(a) Defendants interest rate assumption

here, $n = 25$, $PV = \$2000000$, $PMT = \$156000$

formula, $PV = PMT \left[\frac{1-(1+i)^{-n}}{i} \right]$

$\Rightarrow \cancel{(1+i)^{-n} = 1 - \frac{PV \times i}{PMT}}$

$\Rightarrow i = \cancel{\left(\frac{PMT + PV \times i}{PMT} \right)^{-\frac{1}{n}} - 1}$

So, $i = 5.97\%$.

(b) $n = 25$, $PV = \$2000000$, $PMT = \$255000$

solve for $i = 12\%$

Prosecution interest rate is 12%.

(c)

$n = 25$, $i = 0.09$, $PV = \$2000000$

then find PMT.

$$PMT = \frac{PV}{\left[\frac{1-(1+i)^{-n}}{i} \right]} = \frac{2000000}{\left[\frac{1-(1+0.09)^{-25}}{0.09} \right]}$$

$= \$203612.50$.

Ans.

P.5-61:

(a) here, given, i = 12% = 0.12, PV = \$14000, PMT = -\$2450

Using the $PV = PMT \left[\frac{1-(1+i)^{-n}}{i} \right]$

this formula we find,

$n = 10.21$ years.

(b) i = 0.09 then

solved for $n = 8.38$ years.

(c) i = 0.15 then,

solved for $n = 13.92$ years.

(d) The higher the interest rate, the greater the number of time periods needed to repay the loan fully.

N	Cash flow savings	FV of cash flows	PV of cash flows
1	110,000	117700	102803.7383
2	120,000	137388	104812.6474
3	130,000	159255.59	106118.724
4	150,000	196619.4015	114434.2818
5	160,000	224408.2769	114077.7887
6	150,000	225109.5528	99951.33357
7	90,000	186854.4138	43349.25698
8	90,000	207408.3993	39053.38467
9	90,000	230223.3232	35183.22943
10	90,000	255547.8887	31696.60309
11	90,000	283658.1565	28555.49828

Spreadsheet exercise:

a) Value of the future cash flow savings at the begining of 2016 is $ 2224173.003.

b) The project will not be ~~able~~ accepted since it's PV is lesser than $ 860000.

c) Interest rate risk is the risk the interest rate may not be estimated by the management. It may be greater than that in which case the present value will be even lower. If it is lower than that PV may be higher in which case the project may have a value of more than $ 860000 and in that case it will be wrong to reject the project.