Subject: Time Value of Money

What is Time value of Money?

- It refers the money value with respect to different time period.
- A rupee today is worth more than a rupee one year or more from now because of the interest (or profit) it can earn.
- Example-5 years ago the price of one pen was Rs 10, when now the price of the same pen is Rs 50. **Amount of money is inversely related to the value of money.**
- The relationship between interest and time leads to the concept of time value of money
- Rs 100 today will be having a different value from Rs 100 after one year or two year or so. So we can’nt compare Rs 100 today with Rs 100 after one year.
- Here Rate of Interest (earning power of money) contributes to the change in the value of money over time.

Amount vs. Value of Money

- Amount of money is inversely related to the value of money.
- Money today is valued more because it gives liquidity and an opportunity to invest it and earn returns. This is called Time value of Money.
- Example .. If the interest rate is 10%, then Rs 100 after one year will be Rs. 110. this means money received today is valued more than the money receivable tomorrow.

Use of Time Value of Money?

It is used to evaluate or analyze **any projects** or **financial activities** to find out whether it will be profitable or not. By using the time value of money, the net profit or net loss can be calculated by taking a constant time period.

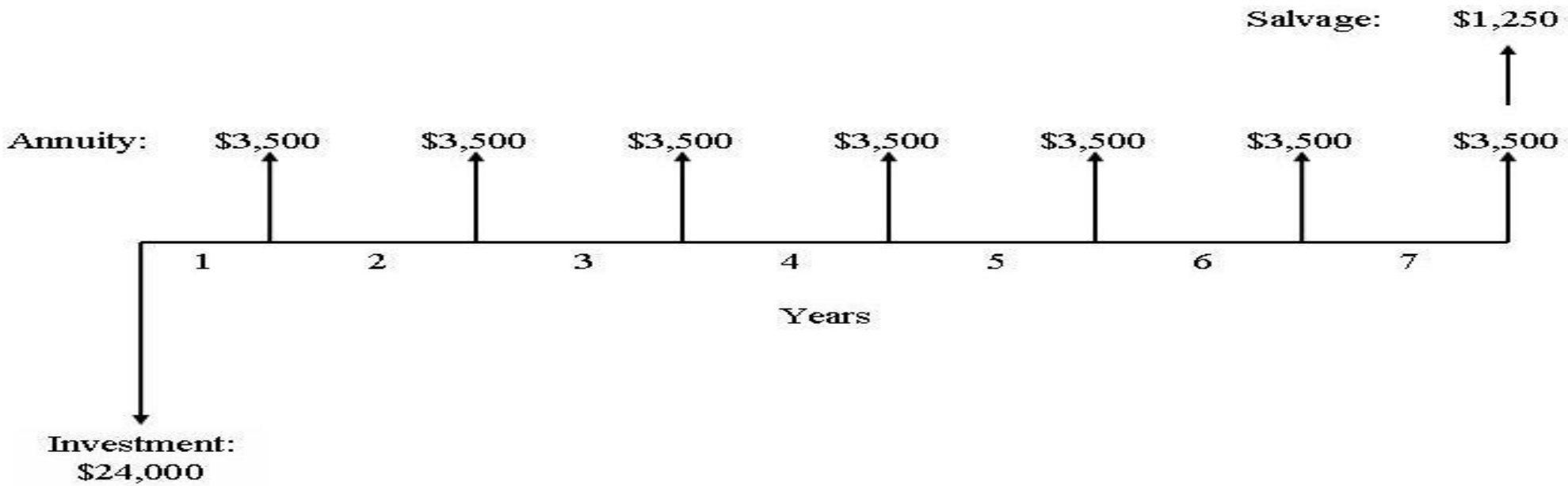
How to calculate?

Two things require to convert the money value from one period to another period. 1) **Cash- Flow Diagram** 2) **Compound interest factors**

Cash- Flow Diagram

- It is the Visual Representation of cash inflows and cash out flows along a time line and this establish a the horizontal scale.
- Individual inflows or outflows are designed by vertical lines and the relative magnitude can be represented by the heights of lines but exact scaling is not necessary.
- Usually cash inflows are shown by vertical lines above the axis and cash outflows below the axis.
- Type of Cash Flow Diagramme
- 1) Single Cash Flow 2) Uniform Series

Example of Cash Flow Diagram..n=5, inv-=10k ,return =50k…P,F,A



Time Value Calculations

- There are 6 compound factors, that can be used to convert the amount of money from one time period to another time period. P/F(i,n), F/P(i,n), P/A(i,n), A/P(i,n), F/A (i,n),A/F
- $P = \mathbf{F\,(1+i)^{-n}}$
- $P=A\,[(1+i)^n-1/i(1+i)^n\,)]$
- $F= P\,(1+i)^n$
- $A= P[(i(1+i)^n\,/(1+i)^n-1)]$
- $A= F\,[i\,/\,(1+i)^n-1]$
- $F= A\,[(1+i)^n-1/i]$

Methods to Evaluation by using time value of money

There are three methods to evaluate any projects.

1. **Present Worth Method**

$P = F(1+i)^{-n}$

$P = A[(1+i)^n - 1/i(1+i)^n)]$

2. **Future Worth Method**

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

$F = A[(1+i)^n - 1/i]$

3. **Annual Worth Method**

$A = P[(i(1+i)^n/(1+i)^n - 1)]$

$A = F[I/(1+i)^n - 1]$

Time Value of Money Examples

Assume a sum of 10,000 is invested for one year at 10% interest.
The future value of that money is:

Thank You.....