

Unit -II

- Growth rate: simple and compound –depreciation – methods of calculating depreciation- time value of money- future and present value- compounding and discounting – Annuities.

Introduction

What is Interest?

- When you borrow Money from someone
- Or use somebody else's Money
- You have to pay a service charge to him.
- This amount is paid back to the Lender along with the original amount borrowed.
- This is sometimes known as the cost of Money which doesn't belong to you, but you have used it.

Introduction

What is Interest?

- This extra amount is called the “INTEREST”
- The original amount borrowed is known as the “PRINCIPAL” or “CAPITAL” in different situations
- The sum of both Principal and the interest is known as “AMOUNT”

Types...

Types of Interest

- There are basically TWO types of Interest
- They are:
- SIMPLE INTEREST
- COMPOUND INTEREST

Simple interest

Simple Interest

- Simple Interest is dependent on:
- Rate of Interest
- Time Period
- Principal
- And the Principal remains the same at the beginning of all the Periods
- It means that the accrual of Interest is linear

Compound....

Compound Interest

- It means that the Principal plus Interest of one period becomes the Principal for the next period
- This goes on till the total time period for which the compound interest is calculated
- This Period is called the period of compounding or the compounding interval

Simple interest

Formula for Interest Calculation

- Let's assume:
- Principal = P
- Amount = A
- Total Interest = I
- Interest Rate = i expressed in % pa
- Time Period = t expressed in Years
- Frequency of Compounding = n expressed in no. Of times in a Year

Compound interest

Formula for Compound Interest

- Pls note that the “Simple Interest” CAN be directly calculated, but the “Compound Interest” CAN’T be directly calculated.
- First the Amount is calculated and then the difference of Amount & Principal is the “Interest”
- $A = P + I$
- $I = A - P$

Depreciation

- Depreciation is an accounting method of allocating the cost of a tangible or physical asset over its [useful life](#) or life expectancy. Depreciation represents how much of an asset's value has been used up.
- Depreciating assets helps companies earn revenue from an asset while expensing a portion of its cost each year the asset is in use. If not taken into account, it can greatly affect [profits](#).
- Depreciation is used to account for declines in the [carrying value](#) over time. Carrying value represents the difference between the original cost and the accumulated depreciation of the years.

Methods ...

- Straight-Line Depreciation.
- Declining Balance Depreciation.
- **Sum**-of-the-Years' Digits Depreciation.
- Units of Production Depreciation.

Annuity

Annuity

- ◆ Annuity is a sequence of periodic payments paid or received at equal time intervals.

Simple

Simple Annuity

- ◇ Simple Annuity is an annuity whose payment interval is the same as the conversion period m .

Classification

Classification of Simple Annuity

1. Ordinary Annuity - (most commonly used) an annuity whose periodic payments are made at the end of each payment interval.
2. Annuity Due – an annuity whose periodic payments are made at the beginning of each payment interval.
3. Deferred Annuity – an annuity whose first payment is to start at some future date.

Cotn..

Ordinary Annuity

- ◆ Ordinary annuity – is a sequence of equal periodic payments due at the end of each period.

TYPES

- Fixed annuities,
- variable annuities,
- fixed-indexed annuities,
- Lifetime Annuities
- immediate annuities
- Leasehold estate
- Free hold estate
- Sinking fund and deferred annuities.

Formula

Formulas in solving problems involving Ordinary Annuity

Required	Formulas
Present Value	$A = R \left[\frac{1 - (1 + i)^{-n}}{i} \right]$
Amount	$S = R \left[\frac{(1 + i)^n - 1}{i} \right]$
Periodic payment given the amount of an ordinary annuity	$R = \frac{Si}{(1 + i)^n - 1}$
Periodic payment given the present value of an ordinary annuity	$R = \frac{Ai}{1 - (1 + i)^{-n}}$
Cash price Where DP=down payment	CP=DP + A

Formula

Formulas in solving problems involving Annuity due.

Required	Formulas
Present Value	$A_{due} = R \left[\frac{1 - (1 + i)^{1-n}}{i} + 1 \right]$
Amount	$S_{due} = R \left[\frac{(1 + i)^{1+n} - 1}{i} - 1 \right]$
Periodic payment given the amount of an ordinary annuity	$R = \frac{S_{due}(i)}{(1 + i)^{n+1} - 1 - i}$
Periodic payment given the present value of an ordinary annuity	$R = \frac{A_{due}(i)}{1 - (1 + i)^{1-n} + i}$
Cash price Where DP=down payment	$CP = DP + A_{due}$

References ..

- <https://www.slideshare.net/hisema/simple-and-compound-interest-24834757>
- <https://www.slideshare.net/reycastro1/basic-concept-of-annuity>