# 2. CONCEPTS IN VALUATION

✎ **Introduction:** In the world of finance and investment, money is not free. Money has a time value. Interest rate gives money its time value. If a person lends his money to other, he foregoes his right to use that money and so he charges interest. This is what leads to Time Value of Money. Today's Rs. 100 has a higher real purchasing power than Rs.100 one year later.

✎ **Basic concepts:**

**1. Present value:** Present Value is the discounted value of one or more future cash flow.

**2. Future Value:** Future Value is the compounded value of Present Value.

**3. Discount Factor:** D.F. is the present value of Rupee received in Future.

**4. Compounding factor:** C.F. is the future value of rupee.

🔸 **FORMULAE:**

1. Simple Present Value (PV) = FV x DF or FV x $[1/(1+R)^n]$

2. Simple Future value (FV) = PV x CF or PV x $(1+R)^n$

❖ SIMPLE FUTURE

1) Akshay deposits Rs. 1,00,000 with the bank which pays 10% interest compounded annually for a period of 3 years. How much amount he will get on maturity?

2) Shahid has invested Rs. 1,00,000 in bank certificate of deposit for 2 years @ 8%. How much will he receive at maturity?

3) Rahul has invested Rs. 15,000 in Fixed deposit of a bank for 4 years at 9% interest. How much will he receive at maturity?

4) If you invest Rs.5,000 today at a compound interest of 9%, what will be its future value after 7 years?

5) Bahubali deposits Rs.1,20,000 with a bank which pays 11% interest compounded annually for a period of 3 years. How much amount would he get at maturity?

❖ SIMPLE PRESENT VALUE

6) A Bank promises to give Rs. 10,000 after 3 years @ 10% interest. How much will you deposit today?

7) Mr. Pappi Singh wants to send his son to UK for MBA studies after 4 years. He would require Rs. 10,00,000 for the same at that time. What amount is he required to invest today if it offered an interest rate of 13% p.a. by XYZ Bank?

8) Find the present value of Rs. 10,000 receivable 6 years hence if the rate of interest is 10%.

❖ Multiple Compounding

9) Find the present value of Rs. 50,000 to be received at the end of 4 years at 12% interest compounded quarterly.

10) Mahadev deposits Rs. 9,000 with a bank at 9% interest compounded quarterly. How much will he get after a period of 7 years?

11) IPL deposits Rs. 10,000 with a bank at 12% interest compounded quarterly. How much amount will he get after 6 years?

12) Calculate the compound value when Rs. 10,000 are invested for 3 years and the interest on it is compounded at 10% p.a. semi annually.

13) Mr. poddar has invested Rs. 50,000 on Photocopy Machine on 1st jan 2002. He estimates net cash income from Photocopy Machine in next 5 years as under:

| Year | Estimated inflows |
|------|-------------------|
| 2002 | 12,000 |
| 2003 | 15,000 |
| 2004 | 18,000 |
| 2005 | 25,000 |
| 2006 | 30,000 |

At the end of 5th year, machine will be sold at scrap value of Rs. 5,000. In addition to investment, working capital is Rs. 5,000. Advice him whether his project is viable, considering interest rate of 10%.

14) An investment of Rs. 40,000 made on 01/04/02 provides inflows as follows:

| *Date* | *Alternative I* | *Alternative II* |
|--------|-----------------|------------------|
| 01/04/03 | 20,000 | 10,000 |
| 01/04/04 | 10,000 | 20,000 |
| 01/04/05 | 10,000 | 10,000 |
| 01/04/06 | 10,000 | 10,000 |

Which alternative would you prefer if the investors expected return is 10%? Give reason for your preferences.

15) Mr. Vishwas is planning to buy a machine which would generate cash flows as follows:

| Year | 0 | 1 | 2 | 3 | 4 |
|------|---|---|---|---|---|
| Cash Flow (Rs.) | (25,000) | 6,000 | 8,000 | 15,000 | 8,000 |

If discount rate is 10%, is it worth investing in machine?

16) Valuing Shares/Security

The share of Sanjay Ltd. (Rs. 10) was quoting at Rs. 102 on 01.04.2012 and the price rose to Rs. 132 on 01/04/2005. Dividends were received at 10% on 30th March each year. Cost of funds was 10%. Is it a worthwhile investment considering the time value of money? (present value factor at 10% were 0.909,0.826 and 0.751)

17) NPV with depreciation

ABC Co. Ltd. is considering investment in a project requiring a capital outlay of Rs. 2,00,000. Forecast for annual income after tax is as follows:

| Year | 1 | 2 | 3 | 4 | 5 |
|------|---|---|---|---|---|
| Profit after Tax (Rs) | 1,00,000 | 1,00,000 | 80,000 | 80,000 | 40,000 |
| Depreciation is 20% on Straight line method. | | | | | |

Evaluate the project on the basis of Net Present Value taking 14% discounting factor and advice whether XYZ & Co. should invest in the project or not?

18) Kuber investor's has introduced a scheme of investment called as "Shri Laxmi". As per the scheme you to invest Rs. 50,000 at the start of five year investment period and your returns at the end of each year for the next 5 years will be Rs. 10,000, 11,000, 12,000, 13,000 and Rs. 15,000. The indicated rate of interest is 10% and present value @10% for the first 5 years are: 0.9091, 0.8264, 0.7513, 0.6830, 0.6209.

You are required to compute the compute the present value of investment and advice regarding the profitability of the investment.

▪ Doubling Period:

Doubling period is the time period in which the money will be doubled at a given interest rate. There are two rules of thumb:

a. Rule 72: According to this rule, the doubling period is obtained by dividing 72 by the interest rate i.e. 72/R

b. Rule of 69: According to this rule, the doubling period is obtained by following formula 0.35+69/R

19) If the interest rate is 10% what are the doubling periods of an investment at this rate?

20) If the interest rate is 12%, what is the doubling period as per the Rule 72 and the Rule 69 respectively?

- Annuity:

  An Annuity is the series of payment of a fixd amount for a specific number of period. When the payment are made at the end of each year, it is called as Ordinary Annuity. On the other hand, when payments are made at the beginning of the year, it is called Annuity due.

  **Formulae:**
  1. Future Value of Annuity
  2. Present Value of Annuity

21) Present Value of Annuity

Find out the present value of a 4 year annuity of Rs. 8,000 at 12% interest?

22) Future value of Annuity

Four equal annual payments of Rs. 5,000 are made into a deposit account that pays 8% interest per year. What is the future value of this annuity at the end of 4 years?

23) Present Value of Annuity

Find out the present value of annuity of Rs. 30,000 for 3 years at 10% discount?

24) BMS MU MARCH 2012

Mr. Anand deposits Rs. 10,000/- annually in a bank for 5 years. The deposit earns 10% interest per year. What is the Future Value of this annuity at the end of 5 years?

25) Try Yourself: Present Value of Annuity

Calculate the present value of annuity of Rs. 7,500 received annually for 5 years, when discounting factor is 10%.

26) Try Yourself: Future Value of Annuity

Eight equal annual payments of Rs. 7,000 are made into a deposit account that pays 9% interest per year. What would be the future value of annuity at the end of eight year?

27) Try Yourself:

Fifteen annual payments of Rs. 5,000 are made into a deposit account that pays 14% interest per yaer. What is the future value of this annuity at the end of 15 years?

28) A is due to receive Rs. 10,000 at the end of 5 years. Since A is in need of money immediately. He wants to sell his interest to B. B wants a return of 10% p.a. on his investment. How much should he pay to A?

29) Interest rate offered:

A finance company advertises that it will pay a lumpsum of Rs. 44,650 at the end of 5 years to investors who deposits annually Rs.6,000 for 5 years. What is the interest rate implicit in this offer?

30) A Bank offers to lend you Rs. 1,00,000 if you sign a note to repay Rs. 1,87,041 at the end of six years. What rate of interest are you paying?

31) Rohit applied for a loan with Yoga bank Ltd. for Rs. 2,50,000. He is asked by the manager of the bank to repay the loan along with the interest rate after 7 years with a final payment of Rs. 6,25,567/-. What is the interest rate charged by the bank?

32) A Bank advertises that it will pay a lump sum of Rs. 4,57,400. At the end of 8 years to the investors who deposits Rs. 40,000 p.a. for 8 years. What is the rate of interest bank is paying? Also find the amount one will receive after 5 years, if he keeps Rs. 5,00,000 as fixed deposit at the same rate of interest if interest is compounded semi annually?

33) How long should you wait
Badal wants to go to USA, the ticket will cost him Rs. 75,000. He can invest Rs. 24,967 today. How many years he will have to wait to go to USA if he can invest this money @13% p.a. assuming the cost of ticket will remain same forever.

34) Akshay wants to purchase a BMW which will cost Rs. 49,52,000/-. He can invest Rs. 20,00,000 today. How many years he has to wait to buy the car if he can invest this money @12% p.a. assuming that the car cost will remain same forever.

35) Cumulative savings:
You can save Rs. 20,000 a year for 5 years and Rs. 3,000 a year for 10 year thereafter. What will these savings cumulative to at the end of 15 years if the rate of interest is 10%?

36) You can save Rs. 25,000 a year for 5 years and Rs. 4,000 a year thereafter for 15 years. What will these savings cumulative to at the end of 20 years if the rate of interest is 10%?

37) The cash flow streams for two alternative investments Tata & Bata are:

| Year | Tata (Rs.) | Bata (Rs.) |
|---|---|---|
| 0 | (2,00,000) | (2,10,000) |
| 1 | 50,000 | 80,000 |
| 2 | 80,000 | 60,000 |
| 3 | 1,00,000 | 80,000 |
| 4 | 80,000 | 60,000 |
| 5 | 60,000 | 80,000 |

**Calculate the:**
  a. Payback period
  b. Net Present value & IRR of each project
  c. Discounting factor @ 10% for Tata and 20% for Bata.

38) Gati company is considering the following three investment proposals requiring a net cash outlay of Rs. 1,20,000; Rs. 1,70,000 respectively. The after cash inflows are tabulated below. Rank these projects in order of their profitability according the **Profitability Index Method**. Assume that the firm's cost of capital is 15% for Project X and Project Y.
Calculate the NPV & IRR of each project.

| Year | After Tax Cash Inflows/CFAT | |
|---|---|---|
| | **Project X** | **Project Y** |
| 1 | 10,000 | 50,000 |
| 2 | 30,000 | 35,000 |
| 3 | 45,000 | 85,000 |
| 4 | 65,000 | 50,000 |
| 5 | 45,000 | 35,000 |