University Elective. –

Topic :- Time Value at Money

⇒ Present Value at Lumpsum

Example. 1

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

(i) 10% Percent.

$$PV_n = 10000\left[\frac{1}{(1.10)^8}\right]$$

$$= 10000 \times 0.467$$

$$= 4670$$

(ii) 12% ~~Pre~~

$$PV_n = 10000\left[\frac{1}{(1.12)^8}\right]$$

$$= 10000 \times 0.404$$

$$= 4040$$

(iii) 15%.

$$PV_n = 10000\left[\frac{1}{(1.15)^8}\right]$$

$$= 10000 \times 0.327$$

$$= 3270$$

Example 2

Example 2

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

$$= 2000\left[\frac{1-\frac{1}{(1.10)^5}}{0.10}\right]$$

$$= 2000 \times 3.791$$

$$= 7582 \text{ Rs.}$$

Example 3

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

$$= 10000\left[\frac{1-\frac{1}{(1.15)^{15}}}{0.15}\right]$$

$$= 10000 \times 5.847$$

$$= 58470 \text{ Rs.}$$

lump sum amount is Rs 500000.

$58470 < 500000$

So Mr. A will be better to choose annual pension.

Example 4 Present Value of Uneven Cashflow

Year	Cash flow (A) (Rs)	PVIF(12%)	[A] Present Value	[B]
1	50	0.893	44.65	446.5
2	100	0.797	79.7	358.65
3	150	0.712	106.8	284.8
4	200	0.636	127.2	222.6
5	250	0.567	141.75	170.1
6	300	0.507	152.1	126.75
7	350	0.452	158.2	90.4
8	400	0.404	161.6	60.6
9	450	0.361	162.45	36.1
10	500	0.322	161	16.1
			1295.45 ≅ 1295 Rs.	1812.6

→ Present Value of Cash flow (B) = 1812.6 ≅ 1813 Rs.

→ Present Value of Cash flow (C) = 2260 Rs.

Example 5

$$\text{P.V. Perpetuity} = \frac{A}{r} = \frac{10000}{0.20} = 50000/- \text{ Rs.}$$

Example 6

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

$$= 10000(1+0.06)^5$$

$$= 10000 \times 1.338$$

$$= 13380.$$

Example 7

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

$$= 40000\left[\frac{(1.08)^5 - 1}{0.08}\right]$$

$$= 40000 \times 5.867$$

$$= 234680 \text{ Rs}$$

Example 8

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

$$80,00,000 = A\left[\frac{(1.09)^8 - 1}{0.09}\right]$$

$$80,00,000 = A \times 11.028$$

$$\therefore A = 725426 \text{ Rs.}$$

So, Vijay has to save 725426 Rs annually to purchase a flat.

Example 9

$$FV_n = PV\left(1 + \frac{r}{m}\right)^{n \times m}$$

a] $FV_n = 20000(1.10)^{20}$

$= \underline{134550}$

b] $FV_n = 20000\left(1 + \frac{0.10}{2}\right)^{20 \times 2}$

$= 20000 \times (1.05)^{40} = \underline{140799.77}$

c] $FV_n = 20000\left(1 + \frac{0.10}{12}\right)^{20 \times 12}$

$= \underline{146561.47}$

Example 10

$$EIR = \left(1 + \frac{r}{m}\right)^{n \times m} - 1$$

$$= \left(1 + \frac{0.06}{4}\right)^{4} - 1$$

$$= 6.136\%$$

Example 11

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

$$200000 = A\left[\frac{1 - \left(\frac{1}{1.10}\right)^{15}}{0.10}\right]$$

$$A = 200000 \div PVIFA_{10\%,\ 15\ years}$$

$$= 200000 \div 7.606$$

$$= 26295\ Rs$$

Mahesh can withdraw 26295 Rs annually.

Example 12

$$10000 = A \times PVIFA_{9\%,\ 3\ years}$$

$$10000 = A \times 2.531$$

$$\therefore A = 10000 \div 2.531$$

$$\therefore A = 3951\ Rs$$

Loan Amortisation Schedule

Year	Payment	Interest	Principal Repayment	O/s Balance
0				10000
1	3951	900	3051	6949
2	3951	625	3326	3623
3	3951	326	3949	0

Practice Sums

1] $FVA_n = A\left[(1+r)^n - 1\right]/r$

$20,00,000 = A \times FVA$ 8%, 10 years

$\therefore A = \frac{20,00,000}{14.487}$

$\therefore A = 1,38,055$ Rs.

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

$= 5,00,000 \times 0.614$

$= 307000$ Rs

→ at 6% = 279000 Rs

→ at 8% = 231500 Rs.

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

→ a] $FV_n = 10000(1.10)^{10}$

$= 10000 \times 2.594$

$= 25940$ Rs.

b] $FV_n = Pv\left(1+\frac{r}{m}\right)^{n \times m}$

$= 10000\left(1+\frac{0.10}{4}\right)^{10 \times 4}$

$= 10000(1.025)^{40}$

$= 26850$ Rs.

4] $EIR = \left[\left(1+\frac{r}{m}\right)^m - 1\right]$

$= \left[\left(1+\frac{0.12}{12}\right)^{12} - 1\right] = 12.68\%$

5] $PVIFA_n = 2000 \times 3.791$

$= 7582$ Rs.

Perpetuity $= A/r$

$= 3000/0.10$

$= 30000$ Rs.

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

$= 30000 \times 0.621$

$= 18630$ Rs.

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Total 26212 Rs