Calculate the PV of an annuity of Rs. 500 received annually for four years when discounting factor is 10%.

Solution.

The present value of series of cash flows can be represented by the following:

$$PV = \sum_{i=1}^{n=4} \frac{C_i}{(1+i)^n}$$

Where,

PV = sum of individual present values of each cash flow: $C_1, C_2, \ldots$

C_n = Cash flows after period 1, 2, 3, … n

i = discounting rate.

Formula for calculation of the present value of an annuity can be derived from the formula for calculating the present value of a series of cash flows:

$$PVA_n = \frac{C_1}{(1+i)^1} + \frac{C_2}{(1+i)^2} + \frac{C_3}{(1+i)^3} + \frac{C_n}{(1+i)^n} = C\left(\frac{1}{(1+i)^1} + \frac{1}{(1+i)^2} + \frac{1}{(1+i)^3} + \frac{1}{(1+i)^n}\right)$$

Where,

PVA_n = Present value of an annuity having a duration of 'n' periods.

A = value of single instalment.

i = rate of interest.

So we have

1 Year	2 Cash flows	3 Present Value Factor at 10%	4 (2x3) Present Value
1	500	0.909	454.5
2	500	0.827	413.5
3	500	0.751	375.5
4	500	0.683	341.5
		3.170	

Method of computing the present value would be to multiply the annual instalment with the present value factor:

$$PVA_n = A \cdot ADF = 500 \cdot 3.170 = \text{Rs.}\,1{,}585$$

Answer: the PV of an annuity $= \text{Rs.}\,1{,}585$.

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