

Solution:

Year (1)	Age (2)	No. of insured person (3)	No. of Death (4)	Amount of claim per death (5)	Present value of Tk. 1 @ 3% (6)	Pv of death claim (7 = 4×5×6)
1	31	61,350	1,350	5,000	0.971	65,54,250
2	32	60,000	2000	5,000	0.943	94,30,000
3	33	58,000	2,970	5,000	0.915	1,35,87,750
4	34	55,030	3,450	5,000	0.888	1,53,18,000
5	35	51,580	4,200	5,000	0.863	1,81,23,000
Total = 6,30,13,000						

We know that,

$$\text{Net Single Premium (NSP)} = \frac{\text{Present value of total claim}}{\text{No. of policy holder at the beginning of the year}}$$

$$= \frac{63013000}{61.350}$$

$$= \text{Tk. 1027.10}$$

Ans. Net Single Premium : Tk. 1027.10.

Calculation of NSP in Term Policy by "Probability Method":

Example 2

From the following information calculate the Net single premium (NSP):

1. The period of term insurance is 5 years.
2. Rate of return on investment is 3%

3. The person is proposing at the age of 35 and the mortality rate per 1000 from the above age are 2.10, 2.25, 2.42, 2.63 and 2.85 respectively.

4. The amount of per policy is Tk. 20,000.

Solution:

The Formula for calculation of present value of Tk. 1

$$P = \frac{S}{(1+i)^n}$$

When,

P = Present value

S = Sum for which present value is to be calculated in this case Tk. 1

i = Rate of interest; in this case 3%

n = Number of years.

Present value of Tk. 1 :

$$1^{\text{st}} \text{ year } P = \frac{S}{(1+i)^n} = \frac{1}{(1+.03)} = \frac{1}{1.03} = .971$$

$$2^{\text{nd}} \text{ year } P = \frac{S}{(1+i)^n} = \frac{1}{(1+.03)^2} = \frac{1}{1.0609} = .943$$

$$3^{\text{rd}} \text{ year } P = \frac{S}{(1+i)^n} = \frac{1}{(1+.03)^3} = \frac{1}{1.0927} = .915$$

$$4^{\text{th}} \text{ year } P = \frac{S}{(1+i)^n} = \frac{1}{(1+.03)^4} = \frac{1}{1.0255} = .888$$

$$5^{\text{th}} \text{ year } P = \frac{S}{(1+i)^n} = \frac{1}{(1+.03)^5} = \frac{1}{1.1593} = .863$$

Table for the calculation of Net Single Premium (NSP) for 5 years term policy

Year (1)	Age (2)	No. of death (3) <i>(1500 = 2.10)</i>	Amount of claim per death (4)	Total death claim (5=3×4)	Present value of Tk. 1 @ 3% (6)	Pv of death claim (7 = 5×6)
1	35	.0021	20,000	42	0.971	40.782
2	36	.00225	20,000	45	0.943	42.435
3	37	.0042	20,000	84	0.915	76.860
4	38	.0063	20,000	126	0.888	111.888
5	39	.0085	20,000	170	0.863	146.710
Total = 418.675						

Ans: Net single premium for 5 years term policy Tk. 418.675

Calculation of NSP in Ordinary Endowment Policy:

Under this policy payment of claim amount is made at the survival of the term or at the death of the life assured whichever is earlier. Payment in this case is certain. Since payment is based on the death and survival, the net premium is calculated on death and survival rate.

The net single premium on the basis of death has been discussed in case of term insurance and on the basis of survival in case of pure endowment assurance. For example, we have to complete net single premium of ordinary endowment policy of 5 years, we can easily base our calculation on death and survival rates.

Example 3

Calculate the i) Net single Premium and 2) Net annual premium for five years endowment policy of Tk. 5,000/- from the following information:

Age	No. of living person	No. of death
35	30,550	4,196
36	26,354	3,285

Calculation of NSP in Pure Endowment Policy:

In this policy, insurer promises to pay the insured value in case the holder survives a certain fixed period. Thus the holder of 5 years pure endowment will be paid only when he survives at the end of 5 years.

The insured, cannot get possession of the money invested in a pure endowment before the expiration of the endowment period. If the insured dies during this period, the entire premium paid is forfeited.

Net Annual Premium (NAP)

Net annual premium (NAP) in case of general endowment policy: Insurance claim can arise in two ways for this type of NAP, due to the death of the policyholder or due to the expiry of the contract.

Here we must calculate the total present value of the insurance claim both the claims of the living policyholder and claims of the death policyholder.

After calculating the total present value of the claim, if we divide it by the present value of premium receivable @ TK. 1 we will find the net annual premium (NAP).

Formula of NAP:

$$\text{NAP} = \frac{\text{Total PV of Claim (death + living)}}{\text{Total PV of Premium collected @Tk 1 Per policy holder}}$$

NAP in case of Pure Endowment Policy: Insurance claim can arise in one way for this type of NAP, the policyholder receives the benefit if he or she survives up to the expiration of the contract. Here we need to calculate the total present value of the insurance claim of the living policyholder. After calculating the total present value of the claim, if we divide it by the present value of premium receivable @ Tk. 1, we will find the net annual premium (NAP).

$$\text{NAP} = \frac{\text{Total PV of living person}}{\text{Total PV of Premium collected @Tk 1 Per policy holder}}$$

Example 4

From the following information calculate the terminal reserve at the end of 3rd year:

1. Rate of interest @ 5% per annum.
2. Net annual premium of a 20 years ordinary endowment policy of Tk. 2000 issued at the age of 40 years is Tk. 10.00.
3. 1,000 policies have been issued.