UNIT FIVE: LIFE INSURANCE

After reading this unit, you should be able to:

- understand the different classes of insurance
- state the difference between life insurance and non-life insurance
- define and explain life insurance
- discuss the different kinds of life insurance contracts or policies
- outline the conditions and provisions in life insurance contracts
- apply the actuarial formulas to determine life insurance premiums.

5.1 INTRODUCTION

As it is discussed in the previous units, there are large number of risks that surround our day-to-day life or our business operation. Among these only few have got insurance coverage. The diversified nature of the insurable risks also demands different provisions and conditions, resulting in large number of insurance contracts or policies. In this unit, we will discuss the different type of insurance contracts (property and life). However, more time will be devoted in the discussing life insurance contract, its features and provisions and condition that apply to it.

5.2 CLASSIFICATION OF INSURANCE

Insurance can be classified as follows:

1. Life Insurance Vs Non-life Insurance

Life Insurance

Life/personal insurance sells on the individual persons. Human lives are insured under this insurance. It also includes supplementary policies that sells to protect households against a loss of earning from disability (disability insurance); injury or incurring a disease (health insurance and living a certain period (endowments, annuities, and pensions).

Non-Life Insurance

Non-life/property/general insurance sells insurance to protect property. Non-life insurance companies sell policies to protect households and firms from the risks of theft, fire, accident, or natural disaster.

It includes insurance to cover

- property losses (i.e., damage to or destructions of homes, automobiles, business, aircraft, etc)
- Liability losses (i.e., payments due to professional negligence, product defects, negligent automobile operation etc)
- Workers' compensation and health insurance payments.

2. Social Vs Private Insurance

Social Insurance

The social insurance is meant to protect and uplift the weaker sections of the society and may be in different forms like pension plans, disability benefits, unemployment benefits, sickness insurance, industrial insurance etc. Premium under such insurance schemes is paid by the government or the employers or by both. In some cases the employees or beneficiaries also contribute their share of the premium.

Private Insurance

Private insurance emphasizes individual actuarial equity, i.e., premiums reflect the expected value of losses. Most private insurances are voluntary although the purchase of some insurance is required by law. A major part of social (governmental insurance) is involuntary, i.e., it is required by law to be purchased by certain groups under certain conditions.

The difference between life insurance and general insurance (non-life insurance)

The following are some of the factors that differentiate life insurance from property (general insurance):

a) Risk

The occurrence of risk (death) in life insurance is certain. But in other insurance the occurrence of the risk insured is uncertain.

b) Procedure

Life insurance requires medical certificate whereas survey is made before a property is insured.

c) Premium and Amount

Since it is difficult to express life in monetary terms the amount insured depends on the personal requirements of the insured. The insure also charges the insured a premium determined according to the age and health condition of the insured. But in other forms of insurance the premium is determined according to the risks involved. The amount of the policy in the property insurance can be taken up to the value of the property.

d) Insurable Interest and Transfer of the Policy

Insurable interest principle is applicable to both life and non-life insurance. However, the time of its requirement may vary. In other words, insurable interest must exist at the time of purchase of a life policy. In marine policy such interest must exist at the time of loss and in fire insurance both at the time of taking the policy and at the time of loss.

A life insurance policy can be transferred either by assignment or by nomination. But in other insurances, the financial right can be transferred only by assignment with prior permission of the insurer.

e) Contract

General insurance contracts are contracts of indemnity, whose purpose is to recover the loss. But life insurance is not a contact of indemnity and subrogation. The amount of compensation is the insured sum in life insurance and life insurance is never a protection against partial loss as compared to the other forms of insurance.

f) Elements and Purposes of Insurance

Life insurance contains both elements of protection and savings (investment). However, in other insurances the investment part is totally absent. Its purpose is simply the protection of the property.

5.3 LIFE INSURANCE

Life insurance is one of the most common forms of insurance. It has gained greater acceptance all over the world. Following the liberalization of the economy of the country in 1993, private insurance companies has emerged in Ethiopia. This has encouraged and motivated the society to use life insurance policies.

The main purpose of life insurance is financial protection of the dependents of the insured and savings for an old age, to cover personal loan and tuition fees for education expense.

5.3.1 Definition

Commercial Code of Ethiopia defines life insurance as "a contract by which the insurer, for a certain sum of money or premium proportioned to the age, health, profession, and other circumstances of the person whose life is insured engages that, if such person shall die within the period limited in

the policy, the insurer will pay according to the terms specified thereof, to the person in whose favor such policies are granted."

From this definition we can consider the following important features of life insurance.

1. Life insurance, like other insurances, is a contract between the insurer the insured whose life is insured or someone who has an insurable interest.
2. Its purpose is financial protection of the dependents of the insured with financial compensation amounting the sum assured if the insured die while the policy is in force.

   Of course, life insurance may also be engaged in encouraging savings to accumulate an educational fund that could be used to pay tuition fees for children when they join higher education, and to settle an outstanding balance of a debt.
3. The insurer charges premium based on age, sex, health condition, occupation and other criteria.
4. Life insurance policy gives protection against special types of risks i.e., death whose occurrence is certain. The uncertainty is related to the causes and time of death.
5. The benefit, financial compensation upon death is determined in advance based on the decision made by the insured and reasonableness of the premium.
6. The insured and policy owner may be different. For example, an individual may insure the life of another person, if he/she has a financial interest.
7. Life insurance is not strictly a contract of indemnity. Because life is priceless. For this reason, if the insured buys more than one policy all of the insurance companies will indemnify fully.

8. The probability of claim for compensation increases with the passage of time due to insured's deteriorating health conditions as they grow old.

5.3.2 Kinds of Life Insurance Policies

According to the duration, life insurance policies may be of the following kinds:

1. Whole-life policies/contracts

This policy provides financial protection to the dependents of insured upon the event of his death. The policy will mature for payment only on the death of the assured or as an exception on the death of his attaining 100 years of age. In other words, the insured can pay premium as long as he/she lives or payment of premium may be made for a specified number of years such as up to retirement date.

Whole life policy provides permanent protection to the insured's dependants in the event of death and it also allows for the accumulation of savings over the life of the insured.

Whole life insurance policies, depending on the manner of premium payment, can be classified as under:

a) Ordinary whole life policy

Under ordinary whole life policy, also known ***as straight life insurance***, the same amount of premium is to be paid at a regular interval, usually annually until the death of the assured or until the achievement of the specified age limit i.e., 100 years. This policy provides life time or permanent protection at a lower cost/premium.

b) Limited-payment whole life insurance

Under the limited payment whole-life policy the premiums are paid for a limited or selected period of time, which is determined in advance (say 10,15,30 years or up to the retirement age of the insured). But the policy will mature for payment only on the death of the assured. That means, after the expiration of the specified period, the policy is said to be "paid up" and no more premium payment is required to keep the policy in force until the death of the insured.

Limited payment life insurance is desirable when one intends to stop premium payments after reaching a given age level, usually upon retirement, but wants to keep the policy in force until his/her death.

The insured pays a higher premium than he would be required on ordinary life plan. Because premium is paid only for a limited number of years in the limited pay insurance plan.

c) Single-payment whole life policy

In this policy premium is paid in a single installment at the purchase of the whole life insurance. This mode of payment is not preferred by most buyers.

Both the premium payments have the same goal. They reach at the same destination. However, the straight pay is better for the insured if the person dies early because she/he pay smaller amount as compared to the other two modes of payment. On the other hand, if the person terminates the contract, the single pay provide a higher cash value.

2. Term Insurance

The term-insurance is issued to provide death benefit to the beneficiary if the insured dies within the specified time period stated in the policy. This policy matures for payment only on the death of the insured within the term period, but if he/she survivals the policy will expire and nothing is payable to the insured. The policy provides only temporary protection and has no saving element. Another important feature of this policy is that since it is

taken for a specified period to deal with premature death, the cost/premium payment is relatively low.

Term policy is issued for short term ranging from few months to a specified number of years such as 10 years, 15 years, 20 years etc.

This insurance also often used when maximum coverage is desired at a minimum premium payment. The following are the different types of term insurance policies.

i) Level Term Policy

This policy provides a constant sum assured (amount of money payable in the event of death) throughout the term of the policy. For example, under a 20 year term policy of Br. 50, 000, the amount of payment/compensation to the insured's beneficiaries will be Birr 50,000 if the insured dies at anytime during the term of the policy.

ii) Decreasing (or Diminishing) Term Policy

In this policy, the amount of claims to be paid to the insured decreases periodically. These policies are usually issued to borrowers of money and the amount of the policy payable at the end of each year is automatically reduced and is equal to the outstanding loan which will be paid if the insured dies before the end of the term. This is also known as "***Mortgage – Redemption Policy***."

This type of policies provides financial protection to the policy holder (creditors) and the dependents of the debtor who are supposed to cover the debt otherwise. Premiums for such type of policies are paid at the beginning of the policy.

The following are types of decreasing term policies.

A. Mortgage Protection Insurance

Mortgage protection insurance is issued in connection with real estate loans made by banks. It gives financial protection to the creditor and the dependents of the debtor of the outstanding mortgage loans in the event of accidental death of the debtor. Since a mortgage loan is paid on an installment basis, the outstanding loan decreases over time. As a result the sum assured decreases and finally becomes zero. This is why it is called decreasing term insurance.

B. Credit Life Insurance

Credit life insurance is issued to give protection to a lender/borrower's dependent of the unpaid balance of a credit transaction if the borrower dies before setting the unpaid balance of his debt.

C. Credit Cooperative Insurance

This policy is issued to protect savings and credit associations from facing a financial losses on the loans they provide to their members, due to death before setting his/her debt.

iii) Renewal (Renewable) Term Policy

This is a term policy that can be renewed after the expiry of the term without medical examination but at a different rate of premium applicable to the age level reached at the time of renewal. For instance, a one year term policies require renewal every year. Similarly, a 10 year term policy may be renewed upon its maturity.

iv) Convertible Term Policy

Under the convertible term policy an option is available to the insured to convert it into whole life or endowment life policy without going in for new medical examination. However, the premium may be adjusted either at the attained age at the time of conversion of the term policy or using the initial term policy issued.

To make the conversation process simple, the following requirements are to be met upon conversation:

1. There will not an increase or decrease in the sum assured.
2. Conversion will have to be made within a specified period, usually before the maturity date of the term policy.

v) Non-Convertible Term Policy

Under the non-convertible term policy an option is not available to the assured to convert into other forms of life insurance contracts. The policy expires upon maturity. However, it gives the policyholder the option to renew it upon expiration.

vi) Increasing Term Contract

Under this policy the sum assured can be arranged each year to correspond to a need of the insured that increases periodically.

On the basis of mode of premium payment, term insurance policies can also be classified as:

a) **Level Premium Policy or Regular premium policy** - The level-premium policy requires the payment of premium regularly in equal installments at a fixed intervals throughout the policy period such as monthly, quarterly or yearly.
b) **Limited Premium Policy** – The payment of premium is limited to a period of attaining certain age of the assured, say retirement age.
c) **Single Premium Policy** – Single premium policy requires the payment of all the premium only once in a lump sum at the time the policy is issued.

3. Endowment Insurance Policy

Endowment policy is issued for a fixed period (endowment period) and premium is payable during that period only. This policy provides protection

of the beneficiary of the insured if he/she dies within the endowment period. In addition, it provides for the payment of the face value of the policy to the insured if he/she is living at the end of the policy period.

This policy is known as a modified form of whole life insurance policy. The period of this policy is shorter than that of whole life insurance and hence the premiums are higher for the same age level. In general, the shorter the endowment period, the higher the premium will be.

One important advantage of this policy over that of term policy is that the insured can terminate the contract at anytime and can collect the cash value in a lump sum which normally becomes positive after two or more years. The policy, therefore, has dual purpose: financial protection and accumulation of funds for possible contingencies in the future. Unlike the term insurance whose purpose is only protecting the insured's dependents upon the death of the insured, endowment policy helps insureds to save money for some other purposes.

Another advantage of endowment policy is that it provides the assured with loan facility after the policy acquires cash value.

The following are the different types of endowment policies.

➵Ordinary Endowment Policy

This policy will mature for payment on the survival of the assured on the date of maturity or on the date of his death within the endowment period. This means payment to the insured or his dependents is certain whether or not he dies before the policy matures or survives the endowment period.

➵Pure Endowment Policy

The pure endowment policy will mature only if the insured person survives the endowment period. In other words, the sum assured is payable only if the insured survive beyond the endowment period. In this case, payment to the insured is uncertain. The objective of this policy is to benefit the insured

himself rather than his dependents. As a result, it is considered as more of an investment than protection.

Cash Surrender Value

Many types of life insurance coverage can be analyzed as consisting of two parts: term insurance and an investment. Normally, this type of contract provides a benefit payable under any set of circumstances, with a larger benefit payable if the insured dies. For example, whole life and endowment life insurance policies provide a set of circumstances, with a larger benefit payable if the insured dies. For example, whole life and endowment life insurance policies provide a stated benefit when the insured person dies, with a smaller benefit if the insured person is living when the benefit is paid.

This smaller benefit, called the ***cash surrender value.*** Cash surrender value is the amount the holder of the policy can elect to receive by surrendering the contract to the insurer while the insured person is alive.

Whole life and endowment policies acquire cash value after two or three years of premium payment. The cash value can be used to keep the policy in force under the automatic premium loan provision, if the insured discontinues premium payment. The policyholder can also apply for loans when the policy acquires cash value. (This will be discussed later).

4. Supplementary Insurance Policies

Supplementary policies as their name suggests are issued only in conjunction with the main life insurance policies i.e., term, whole life or endowment for additional premium for each contract. Supplementary policies also known as **RIDERS**. The supplementary contracts include:

- ⇨ Supplementary Accident Insurance
- ⇨ Total and Permanent disability benefit
- ⇨ Supplementary group accident insurance.

- **Supplementary Accident Insurance:** The amount of cover under this contract is equal to the sum assured under the related main policy. Supplementary accident insurance gives cover against bodily injury effected through external violent and accidental means of which there is evidence of visible contusion or wound on the exterior of the insured's body. After the presentation of proof of bodily injury as specified in the policy, the person will be indemnified in the policy, the person will be indemnified according to different schedule of benefits.

- **Total and Permanent Disability Benefit:** This is also a supplementary contract attached to the main life insurance policy. It is defined here as disability resulting from bodily injury or disease that totally prevents the insured from performing any business or occupation uninterruptedly for a period of at least six months.

- **Group Insurance**: life insurance policies are issued on a group basis. Some of these are:

1) Modified large group life insurance

This policy can be issued to cover natural or accidental death only and compensation is made to the beneficiary only upon the occurrence of death of the member of the group. This policy is a new type of group life policy and issued at least for 200 individuals.

2) Group ordinary life insurance

This is a policy where a number of individuals are insured under a single policy. Basically, it is a whole life insurance issued on a group basis. The member of the group are not required to present evidence of insurability unless the person is above 40 years. The policy holder in this scheme is an employer, a union, a professional association and the like.

The policy can be issued for all employees of the organization as a single group or for different classes of members (management, factory workers etc). The employer decides on behalf of the members of the group. It is also the employer who bears the Insurance premium (non-contributory). In some cases, contributions are made by employees (contributory scheme).

3) Group regularly, yearly renewable term life insurance.

This policy which is issued on a group basis covers risk of death. The policy expires unless it is renewed every year at the appropriate time. The premium is adjusted for the attained age level when it is renewed every year.

5.3.3 Provisions of Life Insurance

The policy conditions and provisions in life insurance that must be agreed by all parties of the contract include the following:

1. **Contract documents:** The life insurance contract requires documents such as the proposal form, the policy term, the medical report and any other supplementary contracts.
2. **General information:** The general information relates to the granting of insurance which is based on the following factors for selection of lives:
   - The build: it relates to the present condition of health and physical build, such as height, weight and other measurements of the life to be insured.
   - Physical condition: the medical examiner's report will reveal the physical condition of the life to be insured.
   - Personal history: relates to the records of illness suffered, accidents met with, surgical operations undergone, etc by the life to be insured.
   - Habits and temperaments
   - Moral hazards
   - Hobbies or avocations
   - Family history

- Occupational hazard
- Age, sex
- Residence and the like

These are the factors used to assess the insurability of individual or group lives.

3. **Payment of Premium:** one of the responsibilities of an insured is to pay the premium agreed at the time of the contract. Payment can be made in different arrangement such as annually, semi-annually, quarterly or monthly. In an annual premium payment arrangement, the insured is expected to pay in advance. However, the insured have the following privileges:

   - ***Grace Period:*** the insured will usually receive a notice of reminder for the payment of premium on the due date for the payment of yearly, semi-annually or quarterly premium not for the monthly payment premium. Usually 30-day grace period is given to the insured. If death occurs within the grace period, the total sum assured less the outstanding premium will be payable to the beneficiary.
   - ***Non-forfeiture Options:*** as explained earlier, the cash surrender value of a life insurance contract (whole life and endowment) is the amount the policy owner could receive if the policy is surrendered to the insured prior to the insured's death. If the policy owners discontinue payment of premiums, he/she can use the cash value to keep the policy in force under the automatic premium loan provision. The insurer will allow the policy to continue automatically with the payment of premium out of the net surrender value.
   - ***Loan Provision:*** It permits the policy owner to borrow against the policy's cash surrender value. Methods for determining the upper limit on the borrowed amount vary among policies.

4. **Policy Conversations:** A policy change clause permits the insured to convert the policy, without demonstrating evidence of insurability, to some other form requiring a higher premium.

5. **Restrictions:** A life policy is subject to the following restrictions:
   - ***Occupation*** – all policies are free from all restrictions as to travel, residence and occupation except where a proposer has at the time of proposal an intention to take up a hazardous occupation or the propose is a student. In all such cases, policies will be issued subject to a suitable endorsement and, if necessary, extra premium will be charged to cover any additional risk, if any.
   - ***Suicide*** – if the insured commits suicide within one year of taking insurance, noting is payable to the beneficiary. In the absence of a suicide clause, adverse selection could occur when a person contemplating suicide takes out a large amount of coverage shortly before committing suicide. The suicide clause makes this type of adverse selection unlikely.
   - ***Proof of Age*** – as the premium is charged on the basis of age of the proposer, proof of age by any one of the prescribed certificates should be submitted along with the proposal invariably where the age of the life insurance at entry is found to be lower than the age given in the proposal form, the premium shall be payable at the correct age and the excess premium already collected will be refunded. On the other hand, if it is higher than the age given in the proposal form, the difference between the premium for the correct age and the original premium already paid will be collected within a certain interest rate.

5.3.4 Life Insurance Premium Determination

The determination of a price for insurance is a complex activity and involves the incorporation of a mathematical analysis into competitive business decision processes. This price is known as premium, which may be paid annually, semi-annually, quarterly or monthly.

Life insurance premium are influenced by the following major determinants:

1. Expected mortality rates in the insured population. The morality table can be prepared from the census records or from the records of the first class insurance companies.
2. Investment income earned by the insurer on invested premium Income-Interest factor. Life insurance is a long term contact and premium so received is invested in securities or deposited in a bank yielding interest. Such income may help reduce the cost of insurance. So interest-earning is also a factor for calculating the premium rate.
3. Expenses incurred in operating an insurance enterprise and in providing insurance – related services. The expense includes policy expenses, commission to agents, cost of preparing policy, administrative and local charges loaded, and other service charges.
4. Other factors required to determine premium rate include: age and sex of the insured, period of the insurance policy, and sum assured.

We will illustrate using a hypothetical example how these determinants are incorporated into rates for life insurance coverage. But first let us discuss the following terms.

1. **Net Premium:** the net premium is a rate determined based on the mortality and interest rates only. No consideration is given for expenses incurred and the future contingencies. The net premium is an amount of money collected by the insured to meet only death claims.
2. **Gross Premium:** gross premium includes all the insured's costs of running the business known as ***loading***. These costs include operating

expenses, commissions, advertisement expenses, etc. So if these expenses and the expected profit to policy issuer are added to net premium, it becomes gross premium, also known as "the office premium." It is a premium the policy holder actually pays to the insurer to keep the policy in force.

Gross Premium = Net premium + Loading

Loading of the premium refers to the process of adding expenses to the net premium. In the next section of this unit, we will illustrate how to determine premium for the life insurance using a hypothetical exercise.

Basic Assumptions for premium determinations

- Premium will be collected at the beginning of the policy period.
- Death benefit will be paid at the end of the policy period
- The premium fund will be deposited in a bank and it will earn interest.
- Every insured will contribute to the premium fund that is meant for the payment of future death claims.

Premium determination for term insurance policy

Example 1:

- Consider term insurance policy buyers at age 30 male population of 958,000.,The expected number of death is 1657,the policy amount is birr 5000 , the going interest rate is 10%.Assuming a one year term insurance policy purchased by the insured group, compute the NSP?

Method-I

Step one: Compute the expected future death claim(EFDC)

(EFDC) = policy amount x number of people dying

= 5000x1657=8285,000

Step two: Find the present value of the expected future death claim.

$$PV(EFDC) = \frac{EFDC}{(1+i)n} = \frac{8,282,000}{(1+0.1)1} = 7,531,818,18$$

Third: Find the NSP per insured person.

NSP= PV(EFDC) =7,531,818-18

Total number of Policy Buyers 958,000

= birr 7.86

Method II

NSP= P.AMT X.D RATE
(1+I)n

=5000x1657/958.000 = birr 7.86
(1+0.1)1

Example 2:
Considering the question in example one above and if the policy is a 3 year term insurance compute the NSP?
Step one:: Compute expected future Death Claim(EFDC)

Yr	Age	Number Living	Number Dying	policy amt	EFDC
1	30	958,000	1657	5000	8,285,000
2	31	956,343	1702	5000	8,510,000
3	32	954,640	1747	5000	8,735,000

Step two: compute the present value of EFDC

Year	EFDC	PVIF(10%)	PV(EFDC)
1	8,285,000	0.90911	7,531,976.35
2	8,510,000	0.8264	7,032,664
3	8,510,000	0,7513	6,562,605.5

T.PV (EFDC) = 21,127,246

Step three: Calculate NSP

NSP= Total PV (EFDC) == 21,127,246 ==22.053
Original Pop.Size 958,000

NSP= 22.053 birr

Method II

Apply the following formula

NSP= $\frac{\sum n}{1+i)n}$ x Policy amount x death rate

NSP= $\frac{5000x1657/985,000}{(1+0.1)1}$ + $\frac{5000x1702/985,000}{(1+0.1)2}$ + $\frac{5000x1747/985,000}{(1+0.1)3}$

NSP= 22.053 birr

Example 3

Considering the question under example 2,convert the net single premium in to a net level premium (NLP) i.e level off the premium payment over the policy period.

Method I

Step one: Assuming that each of the surviving policy buyers will pay a 1 birr premium during the beginning of each year, compute the present value of a 1 birr premium payment.

Year	Insured Paying Premium(1)	PVIF at 10% (2)	PV of 1 birr premium =1x2
1	958,000	1	958,000
2	956,343	0.9091	869411.4213
3	954,640	0.8264	788914.496

Total PV of 1 birr premium=2616325.917

Step two: Compute PV of 1 birr premium per insured

PV of 1 birr premium per insured= $\frac{\text{Total PV of 1 birr premium}}{\text{original population size}}$

PV of 1 birr per insured = $\frac{2616325.917}{958.000}$ = 2.731

Step Three: Compute the NLP

$$NLP = \frac{NSP}{\text{PV of 1 birr premium}} = \frac{22.053}{2.731} = 8.075$$

Method II

In order to compute the present value of a 1 birr premium payment per insured, you may use the following formula:

PV of 1 birr premium per insured $= \sum$ Survival rate x PVIF x1

$$\text{PV of 1 birr premium/ insured} = \frac{(958{,}000 \times 1 \times 1)}{(958{,}000)} + \frac{(956{,}343 \times 0.9091 \times 1)}{(958{,}000} + \frac{(954{,}640 \times o.8264 \times 1)}{(958{,}000)}$$

= 2.731

Exercise 1

According to the 1995 Ethiopian Central Statistic office of mortality table, out of an initial population size of 1,500,000 male people of Bahir Dar city, 100,000 live at the age of 40.The number of people expected to die at age 40 is 500. This means that the probability of death at age 40 will be 500/100,000 = 0.005 or 0.5%. Assume that Ethiopian Insurance Corporation issued a one-year term insurance to all these male individuals aged 40 for death benefit of Birr. 10,000 each.Death claim is to be paid at the end of the term and premium is collected at the beginning of the policy.

Interest rate is 3%.Each insured is assumed to bring the same level of risk to the group.

Required: Based on the information given, how much premium the insurer should charge each insured? (Net single premium)

Exercise 2

Based on the above information and the following mortality table, answer the questions that follow:

Year	Age	No. of living	Number of dying
1	40	100,000	500
2	41	99,500	750
3	42	98,750	1,250
4	43	97,500	1,500
5	44	96,000	---

Assume that the 100,000 population has purchase a 4 year term insurance at the age of 40 for a sum assured equal to Br. 10,000.

Required: Determine

A) The net single premium (NSP) of Term Insurance

B) The net level premium (NLP) of Term Insurance

The following table shows mortality rate and group size of MASSO Life Insurance Company.

Year	Age	Number of Insureds paying premium	Number of Insurds expected to die
1	20	150,000	500
2	21	?	700
3	22	?	300
4	23	?	400

Additional Information

Masso Insurance Company used to collect premium at the beginning of the year and pay death claim or benefits at the end of the year. Face value of the policy to this group is Br. 5,000. The prevailing interest rate is 10%.

Required: Determine

1) The probability of dying at the end of each year and number of insureds expected to pay premium
2) NSP of term insurance
3) NLP of term insurance