4 Traditional Logic

4.1 Nature of Propositions in Traditional Logic :

The Greek Philosopher Aristotle is the founder of Traditional Logic. According to Aristotle proposition consists of terms. **A Term is defined as a word, or group of words which stands as the subject or predicate of a logical proposition.**

For example :

(1) Intelligent people are creative.

(2) Bhumika is the tallest girl in the class.

(3) Tejas is clever.

In the first proposition, the subject term 'Intelligent people', is a group of words. In the second proposition the predicate term 'tallest girl', is a group of words and in the third example both the subject term 'Tejas' and predicate term 'clever' , are single words.

Term is a part of speech representing something, but it **is neither true nor false.** e.g. man, animal, mortality etc. However the **proposition which consists of terms, is either true or false.** An inference can be drawn on the basis of the existing relation between these terms. According to Aristotle, all propositions either assert or deny something. That about which assertion / denial is made, is called the 'Subject term' and that which is asserted / denied of subject is called the **'Predicate term'**. Terms may refer to a whole class, or some members of a class.

For example :

(1) All cows are animals.

(2) Some students are not Successful.

In the first proposition, 'cows' is the subject term and 'animals' is the predicate term. In the second proposition, 'students' is the subject term and 'successful' is the predicate term.

The first proposition, asserts that 'All cows are animals'. while the second proposition denies that 'Some students are successful.'

Terms are constituents of a proposition. The two terms i.e. the subject and predicate of the proposition are unified by the means of a **copula**. Thus a proposition has three constituent elements, namely : subject, predicate and copula. The order of the three elements in a proposition is Subject-Copula-Predicate.

Eg. 'All apples are red'.

In the above example 'Apples' is the subject, 'red' is the predicate and the word 'are' which unifies both 'apple' and 'red' is the copula.

4.2 Traditional Classification of Propositions

In Traditional Logic Propositions are classified into two categories :

(1) Conditional Proposition

(2) Categorical Proposition

4.2.1 Conditional Proposition :

A Conditional proposition is one in which the assertion is made subject to some expressed condition. For example : 'If diesel oil is brought near fire, it will explode'.

In this example 'occurrence of explosion' is subject to the condition of 'diesel oil being brought near fire'.

Conditional Propositions are of two kinds :

(i) Hypothetical Proposition

(ii) Disjunctive Proposition

(i) Hypothetical Proposition :

A hypothetical proposition is one which presents a condition together with some consequence which follows from it.

In a hypothetical proposition there are two propositions. The proposition which states the condition and the proposition which expresses the consequence. The proposition which states the condition is called the antecedent and that which expresses the consequence is called the consequent.

For example : 'If metal is heated, it expands. In this example, it does not refer to any actual instance of metal being expanded when heated, but it only states the condition that if the condition is fulfilled, the consequences will follow.

(ii) Disjunctive Proposition : A Disjunctive proposition is one which states alternatives. This proposition asserts that the alternatives are mutually exclusive or inclusive.

For example :

(1) A line is straight or curved.

(2) Either Ganesh will sing or dance.

In the first example the alternatives are mutually exclusive. If we affirm that 'the line is straight', then we must deny 'it is curved' and vice versa. But in the second example the alternatives are not mutually exclusive but inclusive. By affirming the alternative that 'Ganesh will sing', we cannot deny that 'Ganesh will dance'.

4.2.2 Categorical Propositions :

Categorical proposition is a proposition of relationship between two classes referred to as the class of subject term and the class of predicate term.

By a **'class'** Aristotle means a collection of all individuals, objects etc that have some specified characteristic in common. A categorical proposition affirms or denies a predicate of a subject absolutely. i.e. without any condition. It is unconditional Proposition. **For example :** 'All Chillies are pungent'. The pungency of chilly is not determined by any condition.

Every Categorical proposition has both quality and quantity. Quality of Categorical proposition means that the propositions either assert something or deny something. It is either an Affirmative or Negative proposition. A Categorical proposition is affirmative when its predicate term is affirmed of the subject term and it is negative when its predicate term is denied of the subject term.

For example :

(1) Some people are honest.

(2) No Elephants are carnivorous animals.

The first proposition is affirmative, as in this proposition, the predicate term 'honest' is affirmed of the subject term 'people' and the second proposition is negative, as in this proposition, the predicate term 'carnivorous animals' is denied of the subject term 'Elephants'.

Every Categorical proposition has quantity. A Categorical proposition may assert or deny something about the predicate term. The assertion or denial may refer to either entire (whole) class or some members (part) of the class of subject term. A Categorical Proposition is either Universal or Particular.

It is universal when it refers to all members of the class of the Subject term and it is Particular when it refers to some members of the class of the Subject term.

For example :

(1) All chess players are logical.

(2) Some languages are difficult.

The first proposition is Universal, as in this proposition the subject term i.e. 'the class of chess players' refers to the entire class to which it applies and the second proposition is Particular, as in this proposition the subject term i.e. 'the class of langueages' refers to some members of the class to which it applies.

Classification of Categorical Propositions

According to quality, propositions are classified into Affirmative and Negative and according to quantity, they are classified as Universal and Particular. Thus on the basis of these two principles of quality and quantity, there are four kinds of propositions. This is called the 'Traditional scheme' of Propositions. It is also called as Four fold classification of propositions. The four kinds of propositions included in Traditional scheme are as follows :

(1) Universal Affirmative ('A' Proposition) :

When the proposition is universal in quantity and affirmative in quality, it is called Universal Affirmative proposition. This proposition asserts that the whole of one class i.e. the class of subject term is included in another class i.e. the class of Predicate term. Eg. 'All Teachers are qualified'. This proposition asserts that every member of the class of subject term, 'Teachers', is a member of another class of predicate term, 'qalified persons'. Any Universal Affirmative proposition can be written schematically as follows : 'All S is P'. Where the letters 'S' and 'P' represent the subject and predicate terms, respectively. This proposition is also called as 'A' proposition. It affirms that the relation of inclusion holds between two classes and says that the inclusion is complete. (i.e. universal) All members of class 'S' are said to be, also the members of class 'P'. In other words class S is wholly included in class 'P'.

(2) Universal Negative ('E' Proposition) :

When the proposition is universal in quantity and negative in quality, it is called Universal Negative proposition. This proposition asserts that the whole of one class i.e. the class of subject term is excluded from another class i.e. the class of Predicate term. Eg. No lions are Tigers. This proposition asserts that every member of the class of subject term, 'Lions', is not a member of another class of predicate term, 'Tigers'. Any Universal Negative proposition can be written schematically as follows : 'No S is P'. Where 'S' and 'P' represent the subject and predicate terms, respectively. This proposition is also called as 'E' proposition. It denies the relation of inclusion between two classes universally. No members of class 'S' are members of class 'P'. This proposition asserts that class of subject term, S is wholly excluded from class of predicate term 'P'.

(3) Particular Affirmative ('I' Proposition) :

When the proposition is particular in quantity and affirmative in quality, it is called Particular Affirmative Proposition. This proposition asserts that Some members of one class i.e. the class of Subject term are included in another class i.e. the class of predicate term. Eg. 'Some books are amusing'. This proposition asserts that some members of the class of subject term 'books' are included in another class of predicate term 'amusing'. Any Particular Affirmative proposition may be schematically written as 'Some S is P', which says that atleast one member of class of subject term 'S' is also the member of the class of predicate term 'P'. This proposition is also called as 'I' Proposition. It affirms the relation of inclusion between two classes partially. It asserts that the class of subject term, 'S' is partially included in class of predicate term 'P'.

(4) Particular Negative ('O' Proposition) :

When the Proposition is particular in quantity and negative in quality, it is called Particular Negative Proposition. This proposition asserts that some members of one class i.e. class of subject term are excluded from another class i.e. the class of predicate term. Eg. Some animals are not wild. This proposition asserts that some members of the class of subject term, 'animals' are excluded from another class of predicate term 'Wild beings'. Any Particular Negative proposition may be schematically written as 'Some S is not P', which says that atleast one member of the class of subject term 'S' is not the member of the class of predicate term 'P'. This proposition is also called as 'O' Proposition. It denies the relation of inclusion between two

classes partially. It asserts that the class of subject term, 'S' is partially excluded from the class of predicate term 'P'.

Singular Proposition :

There is another sub-class of propositions, on the basis of quantity. This is singular proposition. A Singular proposition is one in which the predicate is affirmed or denied of a single definite individual. It means the subject of a Singular proposition is a singular term. Traditional logicians considered singular proposition to be Universal Proposition. This is because in a singular proposition, the affirmation or the denial is of the whole subject. A Singular Affirmative proposition is treated as Universal Affirmative proposition i.e. 'A' Proposition and a Negative Singular proposition is considered as Universal Negative Proposition i.e. 'E' Proposition.

For example :

(1) Smruti is smart.

(2) Yogesh is not a coward.

The first example is a Singular Affirmative proposition. It is considered as 'A' proposition in Traditional logic and the second example is a Singular Negative proposition. It is considered as 'E' proposition in traditional logic.

Propositions in ordinary language :

One already knows that a typical Categorical proposition uses the words 'all' or 'some' to denote the quantity of the subject. However in everyday life, one does not always use these words. Ordinary language has variety of words, that denote these quantities.

For example :

(1) Parents are always caring.

(2) A few voters are patriotic.

Different words indicating 'A', 'E', 'I', 'O' propositions are given in the table below :

Categorical Propositions	Words used in a proposition
A	All, every, any, each, always, absolutely, necessarily, invariably, whichever, whoever, whatever etc.
E	No, Not a single, Not even one, never, Not at all, none etc. (These words have Negative meaning)
I	Some, A few, many, most, several, generally, frequently, occasionally, Perhaps, often, certain, all most all, nearly always, etc.
O	Hardly, rarely, scarcely, seldom, few, etc. (These words have negative meaning)

When 'A' proposition is negated, we get 'O' proposition.

When 'I' proposition is negated, we get 'O' proposition.

When 'O' proposition is negated, we get 'I' proposition.

4.3 Distribution of terms in Categorical Propositions

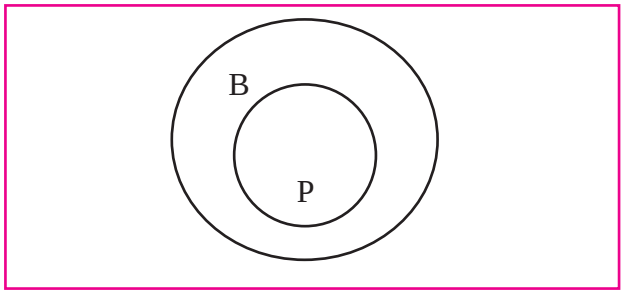
A Categorical proposition may refer to all members of the class or some members of the class. Distribution of term is determined by its reference to class. **The term of proposition is distributed when the proposition refers to the entire class to which it applies and the term of a proposition is undistributed when it refers to the part of the class to which it applies.** Thus each term of a proposition is either distributed or undistributed.

Distribution of terms in Categorical Propositions are as follows :

(1) Distribution of terms in Universal Affirmative / 'A' Proposition :

'A' Proposition is an Universal Affirmative Proposition. Its symbolic form is 'All S is P'. e.g. All parrots are birds. The above example indicates that the class of subject term 'parrots', is wholly included in another class of predicate term, 'birds'. So the subject term of 'A' Proposition is distributed. whereas the class of predicate term 'birds' is not wholly included in the class of subject term 'parrots'. Only part of the class of predicate term, 'birds' is included in the class of subject term, 'parrots'. So the predicate term of 'A' Proposition is undistributed.

Distribution of terms in Universal Affirmative/ 'A' Proposition is well explained by Logician Euler in the following diagram.



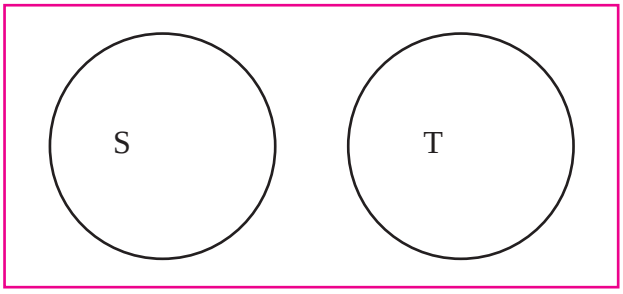
'P' indicates the class of parrots and 'B' indicates the Class of birds.

Hence the subject term is distributed but the predicate term is undistributed in 'A' proposition.

(2) Distribution of terms in Universal Negative / 'E' Proposition :

'E' Proposition is an Universal Negative Proposition. Its symbolic form is 'No S is P'. e.g. No Squares are triangles. In this example the class of subject term squares is wholly excluded from another class of predicate term, 'triangles'. So the subject term of 'E' Proposition is distributed. The class of predicate term 'Triangles' also refers to the entire class. The class of predicate term 'triangles' is also wholly excluded from the class of subject term 'squares'. So the predicate term of 'E' Proposition is also distributed.

Distribution of terms in Universal Negative 'E' Proposition is well explained by Logician Euler in the following diagram.



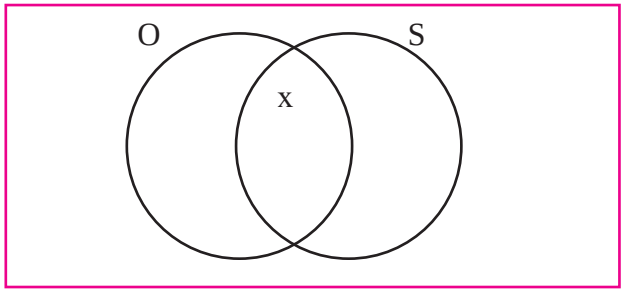
'S' indicates the class of squares and 'T' indicates the class of Triangles.

Hence both the subject term and the predicate term are distributed in 'E' Proposition.

(3) Distribution of terms in Particular Affirmative / 'I' Proposition :

'I' is a Particular Affirmative Proposition. Its symbolic form is 'Some S is P'. e.g. Some Oranges are sour fruits. In this example the class of subject term, 'Oranges' is partially included in another class of predicate term, 'sour fruits'. So the subject term of 'I' proposition is undistributed. The class of predicate term 'sour fruits' is also partially included in the class of subject term 'Oranges'. So the predicate term of 'I' proposition is also undistributed.

Distribution of terms in Particular Affirmative 'I' Proposition is well explained by Logician Euler in the following diagram.



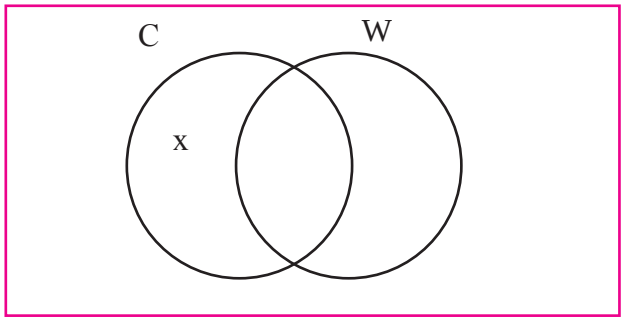
'O' is the class of oranges and 'S' is the Class of sour fruits. 'x' indicates that it is the member of both the classes.

Hence both the subject term and the predicate term are undistributed in 'I' Proposition.

(4) Distribution of terms in Particular Negative / 'O' Proposition :

'O' is a Particular Negative Proposition. Its symbolic form is 'Some S is not P'. e.g. Some cats are not white animals. In this example the class of subject term, 'cats' is partially excluded from another class of predicate term, 'white animals'. So the subject term of 'O' proposition is undistributed, but the class of predicate term 'white animals' is wholly excluded from the class of subject term 'cats'. So the predicate term of 'O' proposition is distributed.

Distribution of terms in Particular Negative 'O' Proposition is well explained by Logician Euler in the following diagram.



'C' indicates the class of cats and 'W' is the class of whit animals. 'x' indicates that it is the member of the class of cats but is not the member of the class of white animals.

Hence the subject term is undistributed in 'O' Proposition, whereas the predicate term is distributed in 'O' Proposition.

Complete the following table.

Categorical Proposition	Subject term	Predicate term
A		
E	Distributed	
I		Undistributed
O		

4.4 Types of Inference

Inference is the process of deriving the conclusion on the basis of observed facts.

For example : After observing the flooded streets, one can derive a conclusion that it might have rained heavily.

Inference is of two types, namely Inductive and Deductive Inference. Traditional Logic explains the difference between Inductive inference and Deductive Inference as follows :

In Inductive inference, one proceeds from particular to general proposition.

e.g. The general proposition that 'All cherries are red', is derived on the basis of observation of few cherries which are red.

In Deductive inference, one proceeds from general to particular proposition.

For example :

All Indians are intelligent.

Rajvi is an Indian

Therefore Rajvi is intelligent.

Deductive inference is of two types :
(1) Immediate (2) Mediate

4.4.1 Immediate Inference :

Immediate inference is a kind of Deductive inference in which the conclusion is drawn directly from one premise without the mediation of any other premise.

Traditionally there are two types of Immediate Inferences :

(1) Inference by Opposition of Propositions and

(2) Inference by Eduction.

(1) Inference by Opposition of Propositions:

Opposition of Propositions is the relation between any two kinds of Categorical propositions having the same subject and predicate terms, but differing in either quantity, quality or both quantity and quality. Considering A, E, I, O in pairs we get four kinds of oppositions, which are correlated with some important truth relations, as follows :

(1) Contradicatory relation [Contradictories] :

Two standard forms of categorical propositions that have the same subject and predicate terms, but differ from each other in both quantity and quality are contradictories. Thus 'A' Proposition and 'O' Propositions are contradictories.

For example : 'All lawyers are fighters' is an 'A' Proposition and 'Some lawyers are not fighters is 'O' Proposition.

Similarly 'E' Proposition and 'I' Propositions are contradictories.

For example : 'No pilots are Marine Engineers', is 'E' Proposition and 'Some pilots and Marine Engineers', is 'I' Proposition.

Both the contradictories cannot be true together and the contradictories cannot be false together.

Contradictory relation can be shown in the table as follows :

A	O
T	F
F	T

E	I
T	F
F	T

O	A
T	F
F	T

I	E
T	F
F	T

(2) Contrary relation [Contraries] :

Traditinally, a pair of Universal Propositions having the same subject and predicate terms but which differ in quality are contraries. Thus 'A' Proposition and 'E' Proposition are contraries.

For example : 'All artists are creative persons', is 'A' Proposition and 'No artists are creative persons', is 'E' Proposition.

The contraries cannot be true together, but may be false together.

Contrary relation can be shown in the table as follows :

A	E
T	F
F	?

E	A
T	F
F	?

(3) Sub-Contrary relation [Sub-Contraries] :

Traditionally, a pair of Particular Propositions having the same subject and predicate terms but which differ in quality are Sub-contraries. Thus 'I' Proposition and 'O' Proposition are Sub-contraries.

For example : 'Some rich men are handsome', is 'I' Proposition and 'Some rich men are not handsome', is 'O' Proposition.

The Sub-contraries may be true together, but cannot be false together.

Sub-contrary relation can be shown in the table as follows :

I	O
T	?
F	T

O	I
T	?
F	T

(4) Sub-Altern relation :

When two Categorical propositions with the same subject and predicate terms, agree in quality but differ in quantity, are called corresponding propositions. Thus 'A' Proposition and 'I' Propositions are corresponding.

For example : 'All branded things are expensive', is 'A' Proposition and 'Some

branded things are expensive', is 'I' Proposition. Both these propositions are corresponding propositions.

Similarly 'E' Proposition and 'O' Propositions are corresponding propositions.

For example : 'No Monkeys are donkeys', is 'E' Proposition and 'Some Monkeys are not donkey' is 'O' Proposition.

This opposition between an Universal proposition and its corresponding Particular proposition is known as Sub-altern. In any such pair of corresponding propositions, **the Universal proposition is called subalternant and the Particular proposition is called sub-alternate.** In sub-altern relation the subalternants (Universal propositions) imply their corresponding sub-alternates (Particular propositions). If universal proposition in any one pair is true then its corresponding Particular proposition is also true and if universal proposition in any one pair is false then its corresponding Particular proposition is doubtful.

If Particular proposition in any one pair is true then its corresponding Universal proposition is doubtful and if the Particular proposition in any one pair is false then its corresponding Universal proposition is also false.

Sub-alteration relation can be shown in the table as follows :

A	I
T	T
F	?

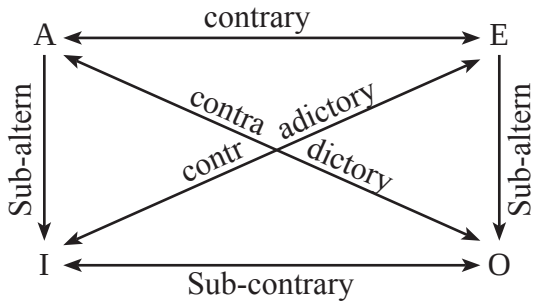
I	A
T	?
F	F

E	O
T	T
F	?

O	E
T	?
F	F

Traditional Logician Aristotle has shown the relation between four kinds of Categorical Propositions in a square as shown below :

sub-alternant **sub-alternant**



Sub-alternate **Sub-alternate**

Traditional square of opposition of propositions.

Examples of opposition of propositions :

1. Any Philosopher is wise [Given proposition - ['A']

   Contradictory : (O) Some Philosophers are not wise.

   Contrary : (E) No Philosopher is wise.

   Sub-altern : (I) Some Philosophers are wise.

2. Not even one man is perfect. [Given propsotion - ['E']

   Contradictory : (I) Some men are prefect.

   Contrary : (A) Every man is perfect.

   Sub-altern : (O) Some men are not perfect.

3. Several metals are heavy. [Given proposition - ['I']

   Contradictory : (E) No metals are heavy.

   Sub-Contrary : (O) Several metals are not heavy.

   Sub-altern : (A) All metals are heavy.

4. A few students are not regular. [Given proposition - 'O']

   Contraditcory :

   (A) All students are regular.

   Sub-contrary :

   (I) A few students are regular.

   Sub-altern :

   (E) No students are regular.

1. All diplomats are liberal.

   Contradictory :

   _____

   Contrary :

   _____

   Sub-altern :

   _____

2. No cats are dogs.

   Contradictory :

   _____

   Contrary :

   _____

   Sub-altern :

   _____

3. Some musicians are singers.

   Contradictory :

   _____

   Sub-contrary :

   _____

   Sub-altern :

   _____

4. Some thin people are not healthy.

   Contradictory :

   _____

   Sub-contrary :

   _____

   Sub-altern :

   _____

5. Every child is innocent.

   Contradictory :

   _____

   Contrary :

   _____

   Sub-altern :

   _____

6. Not a single game is enjoyable.

   Contradictory :

   _____

   Contrary :

   _____

   Sub-altern :

   _____

7. A few lectures are monotonous.

   Contradictory :

   _____

   Sub-contrary :

   _____

   Sub-altern :

   _____

8. Many movies are not tragedies.

   Contradictory :

   _____

   Sub-contrary :

   _____

   Sub-altern :

   _____

9. Executives are always stressed.

   Contradictory :

   _____

   Contrary :

   _____

   Sub-altern :

   _____

10. Ascetics are never materialistic.

    Contradictory :

    _____

    Contrary :

    _____

    Sub-altern :

    _____

(2) Eductions :

Eductions are those forms of immediate inferences in which, one deduces the conclusion, by interchanging the positions of the subject term and the Predicate term of the Premise. i.e. if the Premise is true, Conclusion is also true and if the Premise is false, the conclusion is also false.

There are seven kinds of Eductions. two of which are fundamental. The basic Eductions are : (1) Conversion and (2) Obversion

1. Conversion :

Conversion is a process of immediate inference in which, predicate term of the premise becomes the subject term of the conclusion and the subject term of the premise becomes the Predicate term of the conclusion. Thus in conversion the subject term and the predicate term are interchanged. The original proposition/ premise is called the 'Convertend' and Inferred proposition/conclusion is called Converse.

There are certain rules of Conversion as follows :

(i) The Rule of Quality :

The quality of the converse (conclusion) must remain the same as the original proposition (premise). If the premise is affirmative, the conclusion must be affirmative and if the premise is negative, the conclusion must be negative.'

(ii) The Rule of Distribution :

No term is distributed in the converse (Conclusion) unless it is distributed in the original proposition (Premise). If a term is undistributed in the premise, then it must remain undistributed in the conclusion.

Conversion can be explained with the help of examples as follows :

(1) Converse of 'A' Proposition as per the rule of quality can be either 'A' or 'I'. However the converse of 'A' proposition cannot be 'A'.

For example : 'All roses are red'.

It's converse cannot be 'All red flowers are roses' because the rule of distribution is violated. Therefore the converse of 'A' Proposition is 'I' Proposition,

For example : 'All roses are red'.

This is 'A' Proposition. Converse of 'A' Proposition is 'I' Proposition i.e. 'Some red flowers are roses'.

(2) Converse of 'A' Proposition remains 'A' Proposition, when the denotation of both the terms, i.e. the subject term and the predicate term is the same.

For example : 'The shortest Atricle in this magazine, is the best'.

This is Singular affirmative Proposition, but it is considered as Universal affirmative proposition ('A' Proposition) in Traditional Logic. In this proposition the subject term is 'shortest' and the predicate term is 'best', denotation of both these terms is the same. When one infers converse from this proposition, one merely interchanges the position of the subject term and the predicate term. The converse of this proposition is 'The best Article in this Magazine is shortest'. i.e. the converse of 'A' remains 'A'.

(3) Similarly the converse of 'A' Proposition will remain 'A' Proposition, when the predicate term is the definition of the subject term or peculiar quality possessed by the subject term.

For example : 'Man is a rational animal.'

The converse of this proposition is 'Rational animal is man'. In this case also the converse of 'A' remains 'A', As it is the definition of 'Man' that he is a 'rational animal', When converse of any proposition remains the same proposition it is called as **'Simple Converse'**.

(4) Converse of 'E' Proposition is 'E' Proposition. It is called as Simple Converse.

For example : 'No Ladyfingers are leafy vegetables'. The converse of this proposition is 'No leafy vegetables are Ladyfingers.

(5) Converse of 'I' Proposition is 'I' Proposition. It is also called as Simple Converse.

For example : 'Some actors are dancers. Converse of this proposition is some dancers are actors.'

(6) Converse of 'O' Proposition is not possible. Because according to the rule of Quality, the quality of converse must remain the same. 'O' is a negative proposition so its converse must be negative. i.e. either 'O' or 'E' Proposition. In both these cases, the subject term which is undistributed in the premise of 'O' proposition, gets distributed in the conclusion as it becomes the predicate of 'O' / 'E' proposition in the conclusion.

1. Hexagon means six sided polygon.
   Converse :
   _____
2. Any Chickoo is ripe
   Converse :
   _____
3. No crows are sparrows.
   Converse :
   _____
4. Many Ladies are hardworking.
   Converse :
   _____
5. Few voters are present.
   Converse :
   _____
6. All Tigers are wild.
   Converse :
   _____
7. Not a single cupboard is wooden.
   Converse :
   _____
8. Hardly children are extroverts.
   Converse :
   _____
9. Indians are generally vegetarians.
   Converse :
   _____
10. A few teachers are strict.
    Converse :
    _____

Complete the following table:

Convertend	Converse
A - All S is P	I - Some P is S
E - No S is P	
I - Some S is P	
O - Some S is not P	

(2) Obversion :

Obversion is a process of inference in which the subject term in the conclusion remains the same, as the subject term in the premise, but the predicate of the conclusion is complement (contradictory) to the predicate term in the premise. Thus in Obversion only the predicate term is changed. The original proposition/ premise is called the 'Obvertend' and Inferred proposition/conclusion is called Obverse.

There are certain rules of Obversion as follows :

(i) Rule of Quality :

The quality of the Obverse (conclusion) must change from the original proposition (premise). If the premise is affirmative, the conclusion must be negative and if the premise is negative, the conclusion must be affirmative.

(ii) Rule of Quantity :

The quantity of the Obverse (conclusion) must remain the same as the original proposition (premise). If the premise is Universal proposition,

the conclusion must also be Universal proposition and if the premise is a particular proposition, the conclusion must be a particular proposition.

(iii) Rule of Predicate term :

The Predicate term of Obverse (conclusion) must be complementary (contradictory) to the Predicate term of the original proposition (premise).

Obversion can be explained with the help of examples as follows :

(1) Obverse of 'A' Proposition is 'E' Proposition.

For example : 'All residents are voters'. Its Obverse is 'No residents are non-voters'.

(2) Obverse of 'E' Proposition is 'A' Proposition.

For example : No Umpires are partial. Its Obverse is 'All Umpires are non-partial'.

(3) Obverse of 'I' Proposition is 'O' Proposition.

For example : Flowers are generally colourful. Its Obverse is 'Flowers are generally not non-colourful'.

(4) Obverse of 'O' Proposition is 'I' Proposition.

For example : Mostly houses are not spacious. Its Obverse is 'Mostly houses are non-spacious'.

1. All Journalists are writers.
   Obverse :
   _____
2. No Lions are herbivorous.
   Obverse :
   _____
3. A few subjects are interesting.
   Obverse :
   _____
4. Some producers are not rich.
   Obverse :
   _____
5. Every mother is anxious.
   Obverse :
   _____
6. Not a single stick is straight.
   Obverse :
   _____
7. Many books are expensive.
   Obverse :
   _____
8. Occasionally students are punctual.
   Obverse :
   _____
9. All Gadgets are modern.
   Obverse :
   _____
10. Several Teachers are good speakers.
    Obverse :
    _____

Complete the table given below :

Obvertend	Obverse
A - All S is P	E - No S is non-P
E - No S is P	
I - Some S is P	
O - Some S is not P	

4.4.2 Mediate Inference :

Mediate Inference is a kind of Deductive inference in which the conclusion is derived from two or more premises considered jointly. **Syllogism is a form of Deductive inference, but it is a Mediate inference, in which the conclusion is derived from only two premises taken jointly.** There are three kinds of Syllogism. They are as follows :

(1) Hypothetical Syllogism,

(2) Disjunctive Syllogism,

(3) Categorical Syllogism.

(1) Hypothetical Syllogism :

Hypothetical Syllogism is a deductive argument in which both the premises are hypothetical propositions, where the consequent of the first proposition is same as the antecedent of the second proposition. From this one can derive a conclusion which is also a hypothetical proposition, that contains the antecedent of the first and consequent of the second proposition.

For example : If the country is kept clean, then tourists will visit the country in large numbers.

If tourists visit the country in large numbers, then the country will progress financially.

Therefore if the country is kept clean, the country will progress financially.

(2) Disjunctive Syllogism :

Disjunctive Syllogism is a deductive argument, in which the first premise is a disjunctive proposition which states alternatives and the second premise is the denial of the first alternative of the disjunctive proposition. From this one can derive the conclusion which is the affirmation of second alternative of the disjunctive proposition.

For example : Either Logicians are Philosophers or Mathematicians.

Logicians are not Philosophers.

Therefore Logicians are Mathematician.

(3) Categorical Syllogism :

Categorical Syllogism is defined as a deductive argument consisting of three categorical propositions that together contain exactly three terms, each of which occurs in exactly two of the constituent propositions.

For example : No doctors are lawyers.

Some professors are lawyers.

Therefore some professors are not doctors.

Summary

The Greek Philosopher Aristotle is the founder of Traditional Logic.

Term is defined as a word or group of words which stands as the subject and predicate of a logical proposition.

A proposition has three elements subject - copula - predicate.

Traditionally proposition is classified into (1) Conditional proposition and (2) Categorical proposition.

Conditional propositions is of two types :

(1) Hypothetical proposition and (2) Disjunctive proposition.

(2) Categorical proposition is classified into four kinds namely A, E, I, O.

On the basis of quantity the propositions are classified as Universal and Particular.

On the basis of quality the propositions are classified as Affirmative and Negative.

Thus there are four kinds of propositions :

(1) Universal Affirmative, (2) Universal Negative, (3) Particular Affirmative, and (4) Particular Negative.

In 'A', the subject term is distributed and the predicate term is undistributed.

In 'E', both the subject term and the predicate term are distributed.

In 'I', both the subject term and the predicate term are undistributed.

In 'O', the subject term is undistributed whereas the predicate term is distributed.

A term is distributed when it refers to the entire clas and it is undistributed when it does not refers to the entire class but to the part of the class.

Inference are of two types (1) Immediate and (2) Mediate.

Immediate Inference is of two types (1) Opposition of Proposition and (2) Eduction.

Opposition of proposition is the relation between categorical propositions having the same subject and predicate but differing in quantity, quality or both quantity and quality. There are four kinds of oppositions:

(1) Contradictory, (2) Contrary, (3) Sub-contrary and (4) Sub-altern.

Eduction is of two types : (1) Conversion and (2) Obversion

In Conversion the subject and predicate are interchanged.

The quality of the converse remains the same and no term is distributed in converse until it is distributed in the premise.

Thus : In Categorical proposition,

Converse of SAP is PIS.

Converse of SEP is PES.

Converse of SIP is PIS.

Converse of SOP is not possible.

In Obversion the predicate of the obverse is complementary to the original proposition.

In Obversion the quantity of Obverse remains the same but its quality changes.

Thus : Obverse of SAP is SE$\bar{P}$.

Obverse of SEP is SA$\bar{P}$.

Obverse of SIP is SO$\bar{P}$.

Obverse of SOP is SI$\bar{P}$.

Categorical Propositions	Converse	Obverse
A (S → P)	I (P → S)	E (S → non - p)
E (S → P)	E (P → S)	A (S → non - p)
I (S → P)	I (P → S)	O (S → non - p)
O (S → P)	Not possible	I (S → non - p)

Syllogism is a Mediate inference. It is of three types :

(1) Hypothetical Syllogism and (2) Disjunctive Syllogism, (3) Categorical Syllogism

Exercises

Q. 1. Fill in the blanks with suitable words from those given in the brackets :

(1) ..... is the founder of Traditional Logic. *[Aristotle / Plato]*

(2) In ....., the conclusion is derived from only two premises taken jointly. *[Syllogism / Eduction]*

(3) ..... is a Conditional proposition. *[Disjunctive / Categorical]*

(4) In ..... proposition both the terms are Distributed. *[E / I]*

(5) A term is ....., when it refers to the entire class. *[Distributed / Undistributed]*

(6) ..... Inference is a kind of Deductive inference in which the conclusion is derived from two or more premises considered jointly. *[Mediate/ Immediate]*

(7) ..... is an Immediate Inference.

[Opposition of Propositions / Syllogism]

(8) In ....., the predicate is complementary to the predicate of the original proposition.
[Conversion / Obversion]

(9) There is a relation of ....., between 'A' and 'I' propositions.
[Sub-altern / Sub-contrary]

(10) ..... cannot be true together, but they may be false together.
[Contraries / Sub-contraries]

(11) When denotation of both the terms is same in a proposition, the Converse of 'A' is ..... . *[A / I]*

(12) 'Agricultural land is scarcely available', is a ..... proposition. *[I / O]*

(13) In Traditional Logic, Singular propositions are treated as ..... proposition. *[Universal/ Particular]*

(14) In ..... Proposition, the subject is undistributed, whereas the predicate is distributed. *[A / O]*

(15) ..... proposition is one which presents a condition together with some consequence which follows from it. *[Hypothetical / Disjunctive]*

Q. 2. State whether the following statements are True or False :

(1) In Categorical proposition, Obverse of 'A' Proposition is 'E' Proposition.

(2) 'A' proposition is contradictory to 'E' Proposition.

(3) In Sub-altern relation, the universal propositions imply their corresponding particular propositions.

(4) In Conversion, the quality of the proposition changes.

(5) 'O' Proposition stands for Particular Negative Proposition.

(6) Converse of 'E' Proposition is 'E' Proposition, and it is called as Simple Converse.

(7) Conditional proposition is a proposition of relationship between two classes referred to as the class of subject term and the class of predicate term.

(8) Obversion is a kind of Eduction.

(9) Syllogism is an Inductive inference.

(10) Inference is the act of deriving the conclusion on the basis of observed facts.

(11) Two sub-contraries cannot be true together.

(12) 'All Indians are brain workers', is Universal Affirmative proposition.

(13) In Obversion, no term is distributed in the conclusion, unless it is distributed in the premise.

(14) Term can be neither true nor false.

(15) Converse of 'O' Proposition is 'I' Proposition.

Q. 3. Match the columns :

	(A)	**(B)**
(1)	Mediate Inference	(a) Particular Affirmative Proposition
(2)	Immediate Inference	(b) Categorical syllogism
(3)	Categorical Proposition	(c) Relation between two Universal Proposition
(4)	Contrary	(d) Eduction

Q. 4. Give Logical terms for the following :

(1) A word used in Categorical proposition.

(2) A word which unifies the subject and predicate in a logical proposition.

(3) The term about which assertion is made.

(4) A proposition is one in which the assertion is made subject to some expressed condition, according to traditional logic.

(5) A proposition which states alternatives, according to traditional logic.

(6) A proposition of relationship between two classes referred to as the class of subject term and the class of predicate term, according to traditional logic.

(7) A singular Negative proposition in Traditional Logic.

(8) Categorical Proposition in which the Subject term is Distributed, but the Predicate term is undistributed.

(9) Deductive inference in which the conclusion is drawn directly from one premise without the mediation of any other premise.

(10) An Immediate Inference which shows relation between Categorical Propositions.

(11) A proposition in which the predicate is affirmed or denied of single definite individual.

(12) An Eduction in which the subject term and the predicate terms are interchanged.

(13) An Eduction in which the quality of the proposition changes.

(14) A mediate inference in which the conclusion is drawn from only two premises.

(15) The opposition between an universal proposition and its corresponding particular proposition.

Q. 5. Give Reasons :

(1) Sub-contrary of 'I' proposition is 'O' proposition.

(2) Singular Proposition is called an Univeral Proposition in Traditional Logic.

(3) Converse of 'O' Proposition is not possible.

(4) Obverse of 'A' Proposition is 'E' Proposition

(5) Converse of 'A' Proposition is 'I' Proposition, when it is a general Proposition.

Q. 6. Explain the following :

(1) Traditional scheme of Categorical Proposition.

(2) Distribution of Terms in 'A' Proposition.

(3) Distribution of Terms in 'E' Proposition.

(4) Distribution of Terms in 'I' Proposition.

(5) Distribution of Terms in 'O' Proposition.

(6) Contradictory relation of Categorical propositions.

(7) Contrary relation of Categorical propositions.

(8) Sub-contrary relation of Categorical propositions.

(9) Relation of Sub-altern in Categorical propositions.

(10) Rule of Conversion.

(11) Rule of Obversion.

Q. 7. Give Oppositions of the following propositions :

(1) All red vehicles are BEST buses.
[Contradictory, Contrary]

(2) No crows are white.
[Contrary, Sub-altern]

(3) Some Citizens are patriotic.
[Contradictory, Sub-contrary]

(4) Some mistake are not forgivable.
[Sub-contrary, Sub-altern]

(5) Any fruit is nourishing.
[Contrary, Sub-altern]

(6) Not a single creature is useless.
[Contradictory, Sub-altern]

(7) Many Philosophers are Philanthropist.
[Sub-contrary, Sub-altern]

(8) A few males are not dominating.
[Contradictory, Sub-altern]

(9) Every mango is sweet.
[Contradictory, Sub-altern]

(10) Not even one resource is sufficient.
[Contrary, Contrdiction]

(11) Children often eat Junk food.
[Contradictory, Sub-altern]

(12) Children seldom play out-door games.
[Sub-contrary, Contradictory]

(13) Several Air-hostesses are beautiful.
[Sub-altern, Sub-contrary]

(14) None of the rich are generous.
[Contrary, Contradictory]

(15) Whoever works is paid.
[Contrary, Sub-altern]

(16) Victory is frequently celebrated.
[Sub-contrary, Contradictory]

(17) Some grapes are not green.
[Sub-altern, Sub-contrary]

(18) All Indians are Intelligent.
[Sub-altern, Contradictory]

(19) Games are never borring.
[Contrary, Sub-altern]

(20) Some chemicals are poisonous.
[Sub-altern, Contradictory]

(21) Hardly students study.
[Sub-contrary, Contradictory]

(22) All pilots are smart.
[Contrary, Contradictory]

(23) A few yogis are intuitive.
[sub-contrary, Sub-altern]

(24) Diamonds are always precious.
[Contrary, Contradictory]

(25) No Circles are Triangles.
[Contradictory, Sub-altern]

(26) Theist are always religious.
[Contrary, Contradictory]

(27) Some doctors are not rich.
[Sub-contrary, Sub-altern]

(28) Every Journalist is present.
[Contradictory, Contrary]

(29) No donkeys are fast runners.
[Contradictory, Sub-altern]

(30) Any professor is post graduate.
[Sub-altern, Contrary]

Q. 8. Give Converse and Obverse of the following :

(1) All Indians are Patriotic.

(2) No Managers are Engineers.

(3) Most Actors are famous.

(4) Some flowers are not fragrant.

(5) Every Exam is challenging.

(6) Not a single class-room is bright.

(7) Some leaders are social reformers.

(8) A few leaves are not green.

(9) Any attendance is mandatory.

(10) Many mobile games are addictive.

(11) Some Taxies are not black.

(12) Toys are always colourful.

(13) Salesmen are never introvert.

(14) Some singers are not dancers.

(15) Any Professor is knowledgeable.

(16) Some arguments are valid.

(17) Not even one lady is old.

(18) Most high-ways are broad.

(19) Some families are not nucler.

(20) All sports-men are energetic.

(21) No illiterates are employed.

(22) Some websites are informative.

(23) Some pens are not blue.

(24) Efforts are never wasted.

(25) Every proposition is a sentence.

(26) Some actors are great scientists.

(27) A few artists are feminists.

(28) No social workers are managing directiors.

(29) All medicines are not bitter.

(30) Not a single radio jockey is a football player.