UNIT 1 TYPES OF CATEGORICAL PROPOSITIONS: A, E, I, AND O; SQUARE OF OPPOSITION

Contents

1.0 OBJECTIVES

First objective of this unit is to introduce you to the elements of categorical proposition. This is intended to be achieved through the introduction of the nature of terms and their distinction from words. The second objective is to establish an important distinction between sentence and proposition. The last, but not the least, objective is to familiarize you with certain forms of logical relations called immediate inference which should in turn enable you to establish and discover certain other important logical relations.

1.1 INTRODUCTION

As a form of critical thinking, logic has its origin in several ancient civilizations, like Indian, Chinese, Greek, etc. In the Western tradition, logic was systematized by Aristotle and hence he is credited with its origin. Logic, 'the tool for distinguishing between the true and the false' (Averroes), examines the general forms which arguments may take, and distinguishes between valid and invalid arguments. An argument consists of two sets of statements called premise or premises, on the one hand, and the conclusion on the other. The premises are designed to support the conclusion. The presence of this complex relation (also called inference) makes a group of statements an argument and with which logic is concerned. Thus mere collection of propositions does not constitute an argument when this relation is absent. In this unit we shall confine ourselves to an analysis of terms and propositions which are basic to our study of logic and postpone a detailed study of inference to the next unit.

1.2 TERMS AND THEIR KINDS

Logic makes a sharp distinction between 'word' and 'term'. All words are not terms, but all terms are words. Terms refer to specific classes of objects or qualities whereas words refer to none of them. Further, a term may consist of more than one word. Table, planet, etc. are terms which consist of one word only. *The author of Hamlet* is a term which consists of four words. Words in different languages may express the same term; e.g. *tree, vriksha* etc. While there is only one term in this example, there are two words. Traditional logic has recognized different kinds of terms. A brief description of kinds of terms throws some light on the way in which traditional logic understood 'term'.

Positive and negative: Positive terms signify the presence of desirable qualities e.g., light, health, etc.; negative terms signify, generally, undesirable qualities or qualities not desired, rightly or wrongly. The clearest negative terms are those with the negative prefix 'in' (or 'im'), dis, etc. Inefficient, dishonest, etc. are negative terms. However, it is not always the case. For example, immortal, invaluable, discover, to name a few, surely, are not negative. Therefore what constitutes a negative term is, essentially, our attitude in particular and custom in general. In other words, the distinction is not really logical, but it has something to do with value judgment. That is why some words without such prefixes are regarded as negative since they too imply negation: e.g. darkness (absence of light).

Concrete and abstract: Concrete terms are those which refer to perceptible entities; abstract terms are those which do not; e.g. man, animal, tall etc., are concrete terms; mankind, animalism, etc., are abstract terms. However, this classification depends upon use. For example, the word 'humanity' is used not only to mean individual men but also the quality of man. Hence use or meaning determines the class.

Relative and absolute: Relative terms are those which express a relation between two or more than two persons or things, e.g. father, son, etc. Absolute terms do not express such relation, e.g. nationality, cone, etc. Comparative terms are obviously relative: e.g., larger, prettier, etc.

Singular and General: Singular terms denote specific objects. It points to one object only. All proper names are singular terms. Russellian proper names are also counted among singular terms. '*The author of Principia Mathematica, The farthest planet from the sun',* etc. are singular terms. General terms are just class names. Vegetable, criminal, politician, etc., are examples for general terms.

Univocal, and Equivocal terms: Univocal terms carry only one meaning. Entropy is an example for univocal terms. Equivocal terms are burdened with at least two meanings. Gravity is equivocal; so is astronomical. When natural language becomes the medium of expression, equivocal terms pose hurdles in determining the validity of arguments because such terms cause ambiguous structure of statements. Therefore in our study of logic we must ensure that the arguments consist of only unambiguous terms. Later we will come to know that symbolic logic became indispensable precisely for this reason.

1.3 DENOTATION AND CONNOTATION OF TERMS

By denotation of a term we mean the number of individuals to which the term is applied or extended. For example, 'society' denotes the human society, a philanthropic society, the Society of Jesus, a political society (or a State), etc. Another word used for ‘denotation’ is extension. By connotation or intension of a term we mean the complete meaning of a term as expressed by the sum total of its essential as opposed to accidental characteristics. For example, consider the same term; ‘society’ connotes (a) an association of persons and (b) united by a common interest. Crowd does not mean the same as society because it lacks these characteristics. Complete meaning, therefore, excludes accidental and figurative characteristics. The latter is misleading in the sense that it is not a characteristic at all in the strict sense of the term. Denotation and connotation together determine what is called class or set of objects. Therefore every term stands for one class or the other.

In Scholasticism, connotation and denotation are reserved for terms and comprehension and extension for concepts of which terms are signs, or expressions. Note that the word ‘connotation’ may vary in meaning from time to time. For example, ‘politician’ may acquire a different meaning in different societies at a given point of time or in the same society at different points of time. Therefore connotation is only conventional.

It is clear that greater the connotation (intension) of a term smaller the denotation (extension) and, conversely, greater the denotation smaller the connotation. For example, the term ‘being’ connotes simply ‘existence’ and can be extended to everything that exists (man, animal, plant, stone, etc.). But as soon as I say ‘human being’, thus increasing the connotation (i.e. ‘human’ and ‘being’), the term includes only human beings; not others. ‘Oriental human being’ is still less extensive, for the term cannot be applied to Westerners. This is called the law of inverse variation.

1.4 MEANING AND SUPPOSITION OF TERMS

There is a subtle difference between meaning and supposition. Meaning is what convention accepts. Therefore many words have more than one meaning because convention is always inaccurate. Xystus is one such word which has several meanings like covered portico used for exercise by the athletes in antiquity, a garden walk on terrace, etc. Likewise, ‘Supposition’ of a word is the function or the use of a word which depends upon the intention of the speaker. Therefore meaning is objective whereas supposition is subjective. The Scholastics understood ‘supponit’ as the one which stands for the concept.

Check Your Progress I

Note: Use the space provided for your answer.

1. Critically examine various classes of terms.

....

....

....

2. Analyse the meaning of connotation and denotation.

....

....

....

1.5 PROPOSITIONS

In the previous section we came to know that all terms are words, but all words are not terms. Similarly, all propositions are sentences, but all sentences are not propositions. Only those sentences are propositions which grammar regards as assertive. A proposition is always either true or false, but not both; and no proposition is neither true nor false. This means to say that a proposition is a declarative sentence which gives certain information and it is this information which makes a proposition true or false. It is equally important to note that there is no need to know whether a given proposition is true or false. Further, several sentences may express one proposition. Consider these groups of sentences.

A 1 Jealousy thy name is woman.
2 What is wrong with your car?
3 Copper sulphate is an organic compound.
4 Newton wrote *Optiks*.

B 1 *Cogito Ergo Sum.*
2 I think, therefore I am.

In group A, first two sentences are not assertive sentences (the first sentence is misleading. It appears to be an assertive sentence, but in reality, it is not. Sentences which express emotional outburst are, more or less, exclamatory). The third sentence is false whereas the fourth sentence is true. Group B consists of two sentences which belong to different languages but give the same meaning. Within the same language also it is possible to have two sentences which give the same meaning. Consider this group.

C 1 Rama killed Ravana.
2 Ravana was killed by Rama.

Sentences in B and C groups show that a proposition is the meaning of a sentence. Although several sentences can give one meaning, it is impossible in an unambiguous system to have one sentence with more than one meaning.

A new word is introduced at this point. The *truth-value* of true proposition is said to be true and that of a false proposition is said to be false. Here afterwards we frequently employ this term in our study.

Let us turn to Aristotelian analysis of proposition. A proposition consists of two terms in his system. The term (class) about which the proposition asserts something is called ‘Subject’ (S) and what is said about it is called ‘Predicate’ (P). S and P are to be regarded as S-class and P-class respectively. In a proposition these are related using the verb of the form ‘to be’ called ‘Copula’, which must be always in present tense. According to Aristotle a sentence becomes a proposition only when it meets all these requirements, not otherwise. It is obvious that only the first example considered above (A3) falls within the limits of Aristotelian system. This sort of restriction severely thwarted further progress of logic.

Traditional logic considers two kinds of propositions; categorical (unconditional) and conditional. Assertion is of two types; affirmation and negation. Affirmation or negation is made in the former without stating any condition, whereas in the latter it is stated with condition or conditions. Initially, we shall restrict ourselves to the former kind. Affirmation or negation is possible in this category in two ways; total or partial. If P is affirmed or negated of the whole class of S, then it is total. On the other hand, if affirmation or negation applies to only a part of the class, then it is partial. Consequently, we obtain four kinds of categorical proposition.

1 Universal affirmative (total affirmation)
2 Universal negative (total negation)
3 Particular affirmative (partial affirmation)
4 Particular negative (partial negation)

For the sake of simplicity and brevity (in logic these two are very important) these four kinds are represented symbolically. From *Affirmo,* a Greek, word we choose A and I to represent first and third kinds respectively and similarly, from *Nego,* another Greek word, we choose E and O to represent second and fourth kinds respectively. It is a mere convention to prefix S and suffix P to A, E, I and O. In modern parlance the first letters of S-term and of P-term are used in place of S and P.

Each kind is illustrated below.

S	Copula	P		
1 All (scientific theories)	are	(improvable).	Universal Affirmative	SAI
2 No (celestial bodies)	are	(static).	Universal Negative	CES
3 Some (fruits)	are	(bitter).	Particular Affirmative	FIB
4 Some (chemicals)	are not	(toxic).	Particular Negative	COT

The distinction between universal and particular depends upon what is called quantity and the one between affirmative and negative on what is called quality. Not much discussion is needed to know what quality is. If any negative word like no, not, etc., occurs in the proposition (2 and 3), then quality is negative. Otherwise, it is affirmative. A word of caution is required. Sometimes predicate carries negative force. But it does not make the quality of proposition negative. For example 'dishonest', non-natural, etc. constitute terms in their own right. They have nothing to do with the quality of proposition. Consider these two propositions.

5 Shakuni is *dis*honest.
6 Telepathy is a *non*-natural phenomenon.

These propositions are affirmative only. It means that a proposition is negative only when negative word is a part of copula. However, quantity of proposition needs elaborate explanation which becomes intelligible only after explication of what is called the *distribution* of term.

Distribution of terms is an indispensible concept in Aristotelian logic. A term is said to be distributed if the proposition in which it occurs, either includes or excludes the said term completely. Inclusion or exclusion is complete provided the proposition refers to every member of the class. If so, when is it said to be undistributed? Suppose that n is the number of members in a given class. If the proposition includes or excludes (n – 1) members of that particular class, say S, then S is said to be undistributed.

Let us turn to the pattern of distribution in categorical proposition. Quantity of any proposition is determined by the extension or magnitude of S, i.e., the number of elements in the given set and a term acquires magnitude only when it is a component of a proposition. Only sets have magnitude (this is so as far as logic is concerned). A set is defined as the collection of well-defined elements as its members. A null set or an empty set does not have any element. Let us assume that term is synonymous with set. Then we can accept that a term has magnitude. If magnitude of any term is total in terms of reference, then it is said that the term is distributed. If magnitude is incomplete, then that term is undistributed. It shows that any term is distributed only when the entire set is either included or excluded in such a way that not a single member is left out. This is another way of explicating what complete magnitude means.

All universal propositions distribute S whereas particular propositions do not. Just as distribution is explicated, undistribution also must be explicated. A term is undistributed only when inclusion or exclusion is partial. The meaning of partial inclusion or exclusion is, again, repeated, but in a very different manner. Let us attempt a formal explication of the same. Let the magnitude of S be x. Let S* (to be read s-star) denote that part of S, which is included in or excluded by a proposition. Now the formula, which represents the undistribution of S can be represented as follows:

$$|x| > S^* \geq 1 \quad \ldots\ldots\ldots\ldots.(1)$$

This is the way to read (1): 'The modulus of x (|x|) is greater than S* greater than or equal to 1'. It is highly rewarding to use set theory here. (1) indicates that S* is a proper subset of S. Therefore its magnitude must be smaller than that of x which is the magnitude of S. However, S* is not a null set. (1) shows that there exists at least one member in S*. In the case of undistribution, therefore, the magnitude of S* varies between 1 and | x-1|. Now it is clear that in A and E, S is distributed while in I and O it is undistributed. Just to complete this aspect, let us state that all affirmative propositions undistribute P whereas all negative propositions distribute P.

A far better way of presenting the distribution of terms was invented by Euler, an 18th C. Swiss mathematician and later, John Venn, a 19th C. British mathematician improvised the representation further. An understanding of the techniques adopted by them presupposes some aspects of set theory.

Let S and P be non-null (non-empty) sets with elements as mentioned below (it is important that the status of set must be mentioned invariably, i.e., null or non-null). The following pairs shall be considered.

1. S = {a,b,c,d,e,f}, P = {g,h,i,j,k}

All letters within parentheses are elements of respective sets. In the first grouping there is no common element. Now, consider following groupings.

2. S = {a,b,c,d,e,f}, P = {a,b,c,d,e,f,g,h,i}
3. S = {a,b,c,d,e,f}, P = {b,c,d,g,h}
4. S = {a,b,c,d,e,f}, S* = {a,b,c}, P = {m,n,g,h}
5. S = {a,b,c,d,e}, P = {a,b,c,d,e}

Fifth group is unique in the sense that these two sets possess exactly the same elements. Therefore the magnitude of these sets also remains the same. Such sets are called identical sets. Identity of elements and also the equality of magnitude make sets identical. In 1908, Zermelo proposed what is called 'Axiomatic Set Theory'. One of the principal axioms of this theory is known as the Axiom of Extension or Extensionality. This Axiom helps us to understand the structure of identical sets. This theory was modified later by A Fraenkal and T. Skolem. Let us call this theory Zermelo – Fraenkel – Skolen theory (ZFS theory). This theory states the above mentioned axiom as follows.

ZFS1: If a and b are non-null sets and if, for all x, $x \in a$ iff $x \in b$, then $a \equiv b$

[Note '$\in$' is read 'element of'; 'iff' is read 'if and only if' and '$\equiv$' is read identical.]

Symbolically, it is represented as follows:

$\{Sa \wedge Sb\} \wedge \{\forall x \ (x \in A <=> x \in b) => a \equiv b$

This is the way to read:

Sa = a is a set

$\wedge$ = and

$\forall$ = for all values of

<=> = if and only if

=> = if …then

The summary of this formula is very simple. Whatever description applies to S (here a) also applies to P (here b). When distribution of terms is examined, the magnitude and elements of sets also are examined. Therefore it is wrong to assert that when S and P are identical sets, P is undistributed in A. Let us designate this type of proposition as A+ (read A cross). Consider these two propositions:

7 All bachelors are unmarried men. (BAU)

8 All spinsters are unmarried women. (SAU)

K

T s
s f
d n
tl

S

P

N n
a
c

△ △

s

S

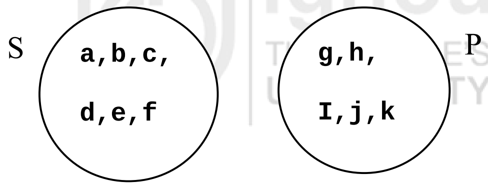
T

S

(

E
h

2 SEP

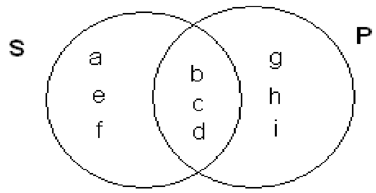


$S = \{a,b,c,d,e,f\}$

$P = \{g,h,i,j,k\}$

$\therefore S \triangle P$

3 SIP

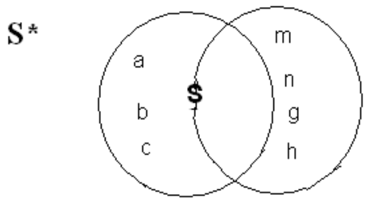


$S = \{a,b,c,d,e,f\}$

$P = \{b,c,d,g,h,i\}$

$S \cap P = \{b,c,d\}$

4 SOP



$S^* = \{a,b,c\}$

$P = \{m,n,g,h\}$

Now we are in a position to examine the fourth group. It requires a little explication to understand the status of O with regard to distribution. In this instance S* is incomplete, i.e., undistributed and P is completely excluded by S*. It shows that P is distributed. Let us see how this happens.

1. Let $S = \{a,b,c,d,e,f\}$
2. Let $S^* = \{a,b,c\}$; there is no information on d, e and f.
3. $S^* \subseteq S$ ($S^* \leq S$); S* is smaller than or equal to S. It also means that S* is only a subset, not a proper subset, of S.
4. Let $S - S^* = S^{**}$ ($S^{**} \geq \Phi$) or $S = S^* + S^{**}$

'Φ' reads phi which stands for null set.

5

6

∴

∴

J

S e
u r
a y
F .,
‘ c
is h
p s
w e
t

1

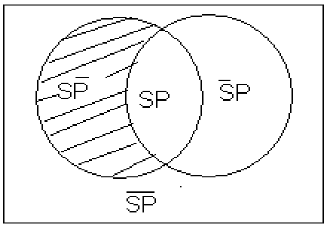
2

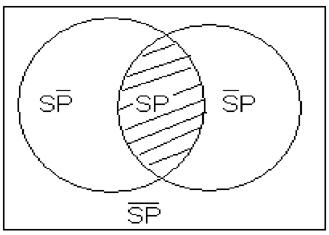
3

4

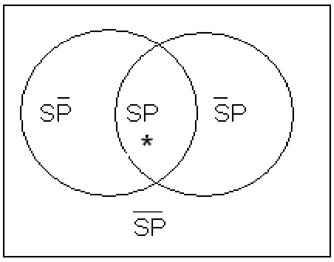
I t
p e
t

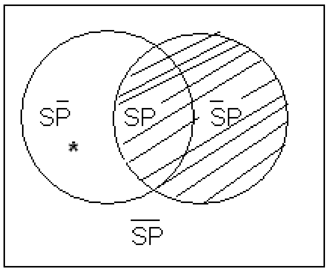
F





F





$\bar{P}$

$\bar{P}$

T y
n ıt
r ɛt
o e
s a
s e
c e
a t;
u

I s
tl c
la ;.
T n
a

T –
F ;.
T n
tl y
e

L n
b

F

REH: $(\forall x)\ \{x \in R) \Rightarrow (x \notin H)\}$; $\notin$ is read 'not an element of'

RIH: $(\exists x) \ni \{(x \in R)\ \Lambda\ (x \in H)\}$; $\exists x$ is read 'there exists at least one x; $\ni$ is read 'such that'.

ROH: $(\exists x) \ni \{(x \in R)\ \Lambda\ (x \notin H)\}$

$\forall$ is known as universal quantifier and $\exists$ is known as existential quantifier. (x) can also be used in place of $(\forall x)$.

1.6 SQUARE OF OPPOSITION

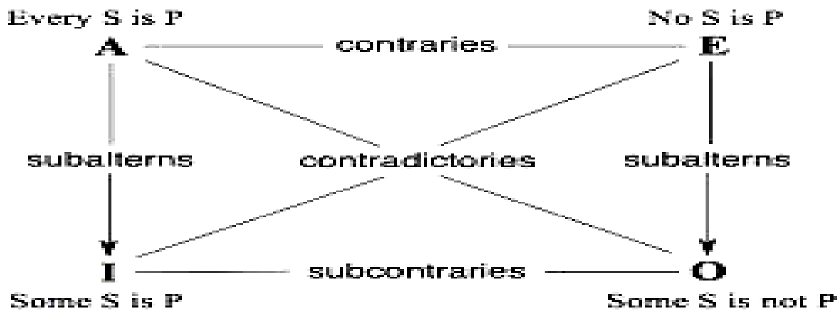
This is one type of immediate inference because in this type of inference conclusion is drawn from one premise only. Eduction is another word used for immediate inference Opposition is a kind of logical relation wherein propositions 'stand against' one another in terms of truth-value when they have the same subject and the same predicate, but differ in quantity or quality or both. Traditional logic called this relation square of opposition because these relations are represented by a square. Four such relations are discussed in Aristotelian system.

1. Contradiction: When two propositions differ in both 'quantity' and 'quality', the relation is called contradiction, e.g. 'All men are wise' (A) – 'Some men are not wise' (O). It is the most complete form of logical opposition because they are neither true nor false together. If one is true, the other is necessarily false and vice versa. This sort of self - contradiction is due to incompatibility between respective statements. Similarly, the statements, 'No men are wise' (E) – 'Some men are wise' (I) are contradictory.
2. Contrariety: When two universal propositions differ only in 'quality', the opposition is called contrary; e.g. 'All men are wise' (A) – 'No men are wise' (E). By definition, both contraries can be false – precisely as in the example given – but they cannot be true at the same time. If one of them is true, the other must necessarily be false, but if one is false, the other may be true or false. One kind of proposition called singular proposition (also called simple), whose S is proper name, has no contrary and its contradiction differs only in quality. One example is 'Jo is bad – Jo is not bad'. Another example is 'The author of Hamlet, is an Englishman and 'The author of Hamlet' is not an Englishman.

3. Subcontrariety: When two particular propositions differ only in 'quality', the opposition is called subcontrariety. E.g. 'Some men are wise' (I) – 'Some men are not wise' (O). Subcontrary propositions can be true together – as in the example given, but they cannot be false at the same time. If one of them is true, the other may be true or false, but if one of them is false, the other must necessarily be true. The inverse order of 'contrary' and 'subcontrary' propositions is evident.

4 Subalternation: When two propositions differ only in 'quantity' (one is universal and the other is particular), the opposition is called subalternation, e.g. 'All men are wise' (A) - 'Some men are wise' (I). Notice that 'subaltern' propositions can be true together or false together. And this is to say that though from the truth of the universal, one can infer the truth of the particular the reverse order does not hold, namely that from the truth of the particular, one cannot infer the truth of the universal. On the other hand, though from the falsity of the particular, one can infer the falsity of the universal, one cannot infer the falsity of the particular from the falsity of the universal.

This type of relation is expressed in the form of a square.



The following two schemes and one diagram offer visual aid to retain more easily in mind what we have just said about the 'opposition' of propositions:

For the sake of simplicity the truth - relation which holds good between various relations is provided in a nutshell.

Inferences in Subalternation

From truth of universal	→	truth of particular
From truth of particular	/→	truth of universal
From falsity of particular	→	falsity of universal
From falsity of universal	/→	falsity of particular

→: Can infer
/→: Cannot infer

II. Mnemonic Device for remembering the Square of Opposition (Lander University, Greenwood).

A. If you picture God at the top of the square of opposition and the Devil at the bottom of the square and remember the phrase 'both cannot be ...' for contraries and subcontraries, the following mnemonic device might be helpful.

B. The big ‘X’ across the center of the Square represents contradictories with opposite truth – values. This should be very easy to remember.

C. Since God (or truth) is at the top of the diagram, both contraries ‘cannot be true.’

D. Since the Devil (or falsity) is at the bottom of the diagram, both subcontraries ‘cannot be false’.

E. With subalternation, God can send truth down, but we cannot know what it means for God to send falsity down (hence this would be indeterminate).

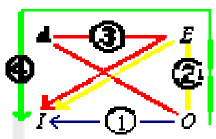
But, the Devil can send falsity up (since this is what Devils are good at), and we cannot know what it means for the Devil to send truth up. So this relation is indeterminate.

III. ‘Bouncing Around the Square of Opposition.’

Suppose we know that O (Some **S** is not **P)** is false. In how many ways can we determine the truth - value of **I** (‘Some **S** is **P**’)?

There are four ways of determining the truth-value. These four ways consist in travelling between different points (here the propositions are points). The four routes are as follows. (Notice that we could set an itinerary of our journey along the selected four routes. The ‘reason,’ given below, is, so to speak, our ‘inference ticket’ for travel Cf. Lander University, Greenwood).

	Originating Point	Through	Terminating Point
1	SOP	Direct	SIP
2	SOP	SEP	SIP
3	SOP	SAP to SEP	SIP
4	SOP	SEP and SAP	SIP



Route 1: **O** to **I**

Statement of	Reason	Truth -Value
1. Some **S** is not **P**.	Given	false
2. Some **S** is **P**.	subcontrariety	true

Route 2: **O** to **I through E**

Statement	Reason	Truth - Value
1. Some **S** is not **P**.	given	false
2. No **S is P.**	subalternation	false

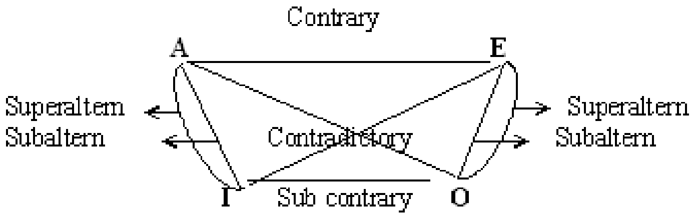
3

S
1
2
3
4
C
r

S
1
2
3
4

V e
n e
c t
r ,
d n
t e
a

T s
p



C e
t r
C t
p d
u

At this stage, it is important to become familiar with two other types of relation called conversion and obversion. They are also known as equivalent relation because the truth-value of both the premise and the conclusion remains the same, i.e. if the premise is true, the conclusion is true and if the premise is false, the conclusion is also false. When there is a change in the structure of sentences, on some occasions meaning remains unchanged. It only means that the very same information is provided in different ways. Recognition of this simple fact helps us in testing accurately the validity of arguments and also in avoiding confusions. There are two primary forms of equivalent relation; conversion and obversion. The conclusion in conversion is called converse and in obversion obverse. The processes of conversion and obversion are quite simple. These operations deserve a close scrutiny.

Conversion: This is governed by three laws.

1st Law: S and P must be transposed.

After transposition P becomes subject and S becomes predicate. This is the 1st stage.

2nd Law: Quality of propositions should remain constant. If the premise is affirmative, the conclusion must be affirmative. If the premise is negative, the conclusion must be negative.

3rd Law: A term, which is undistributed in the premise, should remain undistributed in the conclusion. It can be stated in another way also. A term can be distributed in the conclusion only if it is distributed in the premise. However, a term, which is distributed in the premise, may or may not be distributed in the conclusion. The following examples illustrate these rules.

10 All philosophers are kings	PAK
Converse: ∴ Some kinks are philosophers.	KIP
11 No vegetables are harmful.	VEH
Converse: ∴ No harmful things are vegetables.	HEV
12 Some women are talkative.	WIT
Converse: ∴ Some talkative people are women.	TIW

There are three aspects to be noted. Conversion of A is conversion by limitation because the quantity is reduced from universal to particular after conversion. Secondly, conversion of E and I is simple because in these cases S and P are just transposed and no other change takes place. Thirdly, while A, E and I have conversion, O does not have conversion. What happens when A undergoes simple conversion and O is converted? In these cases conversion leads to a fallacy called fallacy of illicit conversion. Fallacy in formal logic arises when a rule is violated. In both these cases conversion violates a rule or rules.

Consider these statements.

13 All Europeans are white.

∴ All white people are Europeans.

14 Some gods are not powerful.

∴ Some powerful beings are not gods.

Conversion in these two cases is invalid because the terms, 'white' and 'gods' are distributed in the respective conclusions while they are undistributed in the respective premises. This type of conversion violates the third law. The terms 'white' and 'gods' remain undistributed in the premises since the former is the predicate of an affirmative premise while the latter is the subject of a particular premise. If we obtain affirmative converse from a negative premise in order to undistibute predicate term, then we violate the second law of conversion. It only means that when A undergoes simple conversion and when O is converted, in the case of A the third law is violated and in the case of O second or third law of conversion, as the case may be is violated. Therefore A becomes I after conversion and 'O' has no conversion.

Obversion: This is one technique of preserving the meaning of a statement after effecting change of quality. The procedure is very simple; change the quality of the premise and simultaneously replace the predicate by its complementary. We apply this law to the premises (A, E, I, and O) to obtain the conclusions. The conclusion is called obversion.

15	All players are experts.	PAE
	$\therefore$ No players are non-experts.	PE$\overline{E}$
16	No musicians are novelists.	MEN
	$\therefore$ All musicians are non-novelists.	MA$\overline{N}$
17	Some scholars are women.	S I W
	$\therefore$ Some scholars are not non-women.	SO$\overline{W}$
18	Some strangers are not helpful.	SO H
	$\therefore$ Some stranger are non-helpful.	S I $\overline{H}$

Check Your Progress II

Note: Use the space provided for your answers.
1 Give symbolic representation of propositions? What do the symbols stand for?
....
....
....
....
2. Determine all possible product classes of the following terms and their complements.

a) players and experts b) philosophers and kings c) fruits and vegetables d) actors and directors
....

1.7 LET US SUM UP

The basic units of argument are terms and proposition. All words are not terms; all terms are words. All sentences are not propositions; all propositions are sentences. Subject and predicate are the constituents of categorical proposition according to Aristotle. There are four kinds of categorical proposition. Distribution of a term means total extension. Euler and Venn interpreted distribution diagrammatically. Square of opposition, conversion and obversion are three kinds of immediate inference.

1.8 KEY WORDS

Supposition: A 'supposition' of a word is the function or the use of a word has in a presupposition depending on the intention of the speaker.

Term: Any word or group of words that stands for the subject or the predicate of a proposition.

Proposition: A statement affirming or denying something of somebody.

Categorical proposition: It is a proposition in which the predicate is affirmed or denied unconditionally of all or part of the subject.

Copula: A 'copula' joins the subject and the predicate of the preposition. Normally it is the verb 'is' or 'is not'.

1.9 FURTHER READINGS AND REFERENCES

Azzopardi, Salvino. *Logic*. Pune: Jnana Deepa Vidyapeeth, [1981].

Copi, Irving M., and Carl Cohen. *Logic*. 10th ed. New Jersy, 1998.

Copi, Irving M., and Carl Cohen. *Essentials of Logic*. 2nd ed. Upper Saddle River, N.J.: Pearson Prentice Hall, 2007.

'Introduction to Logic,' University of Lander, http://philosophy.lander.edu/logic/index.html, accessed July, 2010.

Priest, Graham. *Logic*: A Very Short Introduction. Oxford: OUP, 2001.

Shand, John. *Arguing Well*. London. Routledge, 2000.

Zegarelli, Mark. *Logic For Dummies*. New York: Wiley, John & Sons, Incorporated, 2006.