UNIT: 9 MODERN CLASSIFICATION OF PROPOSITION: SIMPLE AND COMPOUND, SINGULAR AND GENERAL

Unit Structure

9.1 LEARNING OBJECTIVES

After going through this unit, you will be able to

- explain the meaning of proposition as defined by modern logicians,
- explain the modern analysis of proposition,
- describe the traditional and modern classification of proposition,
- describe how to acquaint with symbols used in modern logic.

9.2: INTRODUCTION

This unit introduces you to the modern analysis and classification of proposition. Modern logicians do not agree with the traditional definition of proposition. They define proposition as a statement which is either true or false. But it can not be both true and false. A proposition is not identical with sentence. Similarly a proposition may express a fact but it is not a fact. Only indicative sentences may be judged to be either true or false. A proposition may have any number of constituents and these constituents are combined in various ways. The mode of combination expresses the

PDF created with pdfFactory Pro trial version www.pdffactory.com

logical form of proposition. Modern logicians have classified proposition into simple, compound and general.

9.3 MODERN ANALYSIS OF PROPOSITION

In modern logic proposition means a statement which is said to be true or false. For example, 'Asoka was the king of Pataliputra', 3+6=9, 'Socrates was a philosopher' 'No man is immortal'. Truth or falsity can be ascribed to every one of them. Every one of them can be either true or false. But 'May God help us' -is not a proposition; because the property's truth or falsity can not be ascribed to it. In modern logic the components of a proposition i.e. the subject and the predicate are known as 'constituents' of a proposition. The truth or falsity of a proposition is called its truth value. The truth-value of a proposition is determined by the fact. If a proposition represents a fact as it is, then the proposition is true; otherwise it is false. But a proposition is different from a fact.

9.4 PROPOSITION AND SENTENCE

There is a clear difference between a proposition and a sentence. Though a proposition is expressed in the form of a sentence, it is not identical with a sentence. We can point out following points as their differences,

- A proposition may be understood as that to which truth or falsity can be ascribed. But truth or falsity can not be ascribed to all kinds of sentences.
- All grammatical sentences are not propositions. Only indicative sentence can be judged to be either true or false. Interrogative sentences, Imperative sentences, Optative sentences can not be judged to be either true or false. For example, 'Have you ever gone to Calcutta'? 'May God help us!' Truth or falsity can not be ascribed to it. So they are not propositions.
- The same proposition may have different verbal expressions. Therefore the same proposition may be expressed by different sentences. But various sentences have a single underlying meaning which is called a proposition.

9.5 MODERN CLASSIFICATION OF PROPOSITION

The modern logicians have broadly classified the propositions into elementary proposition and non-elementary proposition. Elementary propositions are of two kinds viz. A) Simple and B) Compound propositions.

PDF created with pdfFactory Pro trial version www.pdffactory.com

Non-elementary propositions include all general propositions. Let us discuss all types of proposition.

A) Simple proposition: A simple proposition expresses a simple fact and it can not be analyzed into further propositions. Moreover a simple proposition makes an assertion about an individual, a person, a place, a thing, a country and so on. For example: Seema is doing a course in logic. Simple proposition have four forms: (1) Subjectless proposition (2) Subject-predicate proposition (3) Relational proposition (4) Class-membership proposition.

1. Subjectless proposition: The simplest kind of proposition is the subjectless proposition e.g. Fire! Thieves! These propositions are also known as the exclamatory propositions. The proposition such as: It rains, it thunders. etc. are known as impersonal propositions. Such propositions have no logical subject. In these propositions the thinker asserts something but the statement is not fully expressed. These propositions give information and therefore they are regarded as propositions.

2. Subject-predicate proposition: A proposition which asserts that a quality or an attribute belongs to something is called a subject-predicate proposition. e.g. 1. Shyam is intelligent. 2. This paper is white. Subject of this type proposition is a singular term. The subject-predicate type of proposition is represented simply as 'S-P'. In predicate logic small letters a, b, c, --- are used to symbolize individuals, and capital letters A, B, C, --- and are used to symbolize attributes. For example: Shyam is intelligent. The symbolic expression of this proposition is -I

Here the symbols 'I' stands for intelligent and's' stands for Shyam.

3. Relational proposition: Relational proposition asserts a relation between two or more constituents. There are various ways to express relations. We may use the verbs -drink, love, enemy, hurt, or words greater than, smaller than etc. to express various relations. For example: the lecturer teaches a course in English, he owes me fifty rupees for a bag.

A relational proposition may contain any number of constituents. According to the number of constituents the relations are called dyadic, triadic, tetradic, pentadic. Relations involving more than five terms are called polyadic relations.

The constituents of a relational proposition are not the subjects and predicates but they are the terms of relations or subjects of relations.

In a relational proposition the relation proceeds from something to something else. This is called the direction or sense of relation. The term

PDF created with pdfFactory Pro trial version www.pdffactory.com

from which the relation proceeds is called the referent and the term to which the relation proceeds is called the relatum. In the above example the term 'The lecturer' is a referent and the term, a course in English is relatum.

4. Class-membership proposition: Class-membership proposition asserts that an individual is a member of a class. For example: Rabindra Nath Tagore is a poet. This class-membership proposition is symbolically expressed as r ? P. Here 'r' stands for Rabindra Nath Tagore and 'P' stands for the class of poet. In symbolic logic capital letters A, B, C---are used to symbolize the class and small letters a, b, c, ---are used to symbolize the individual.

B) Compound proposition: A compound proposition contains two or more simple propositions as its components. For example: Socrates was a philosopher and Russell was a mathematician. This proposition is a single proposition. Simple propositions are combined by various ways to form a compound proposition. According to the modes of combination we have four kinds of compound proposition. They are-

1. Conjunctive proposition
2. Disjunctive proposition
3. Alternative proposition
4. Implicative proposition

1. Conjunctive proposition: The compound proposition in which two or more simple propositions are combined by the word 'and' is known as conjunctive proposition. For example: Monmohan Singh is the Prime Minister of India and Barak Obama is the President of the U.S.A. This conjunctive proposition is symbolically expressed as p .q

In this expression 'p' and 'q' stand for two simple propositions; and the symbol dot (.) stands for 'and'.

The components of a conjunctive proposition are called 'conjuncts'.

A conjunctive proposition is true if and only if both (or all) the conjuncts are true. The words such as 'but', 'although', 'while', 'yet' etc. are also used to combine the simple proposition.

2. Disjunctive proposition: The compound proposition in which two propositions are combined into one by the word 'or' (either-or) used in inclusive sense is called disjunctive proposition. For example: Either Logic is interesting subject or it is a scoring subject. The components of a disjunctive proposition are presented in the form of 'disjuncts'. This disjunctive proposition may be symbolically stated as p v q

PDF created with pdfFactory Pro trial version www.pdffactory.com

Here p and q stand for two disjuncts and the symbol 'v' (the Latin word 'vel' or 'wedge') stands for 'either-or' in its inclusive sense.

A disjunctive proposition is true if and only if at least one of the disjuncts is true. In other words a disjunctive proposition is true in case of one or other or both disjuncts are true.

3. Alternative proposition: The compound proposition in which two propositions are combined into one by the word 'or' (either-or) used in exclusive sense is called alternative proposition. As for example, the man is either literate or illiterate. The components of an alternative proposition are presented in the form of Alternatives.

This proposition may be symbolically stated as $p \veebar q$

Here, p and q stand for two alternatives and the symbol $\veebar$ (the Latin word 'aut') stands for 'or' in its exclusive sense. The meaning of 'or' in its exclusive sense can be expressed as $(p \veebar q)$.- (p. q)

An alternative proposition is true only if one of the alternatives is false.

4. Implicative proposition: The compound proposition in which two simple propositions are combined by the word 'if-then' is called an implicative proposition. For example: 'If there is drought then the price of food grains will rise'.

The component proposition which follows 'if' is called the antecedent or the 'implicans' and the component proposition which follows 'then' is called the 'consequent' or the 'implicate'. In an implicative proposition one component proposition implies the other. The proposition which implies the other is 'implicans' and the proposition which is implied is 'implicate'.

In an implicate proposition the implicate logically follows from the implicant.

In other words, if the antecedent is true, then consequent is also true. It means (1) If antecedent is true then consequent is also true or it is not the case that the antecedent is true and the consequent is false.

C) General proposition

General propositions are non-compound propositions. They are about classes. Such propositions either affirm or deny (1) the existence of something or (2) a property of the whole universe or 3) the relation between two classes. So there are three kinds of general propositions. They are

1) Existential General Proposition

PDF created with pdfFactory Pro trial version www.pdffactory.com

2) One-Predicate General Proposition.

3) General Propositions asserting relations between two classes.

1) Existential General Proposition

An existential proposition directly affirms or denies the existence of something. For example: a) Tiger exists.

b) There are no unicorns.

In predicate logic the first propositions can be symbolized by using existential quantifier as (ɜ x) (Tx)

This proposition states that 'there is something which is a tiger'. The second proposition can be symbolized as || (ɜ x) (Ux) This proposition states that, 'it is not the case that there is something which is a unicorn'. The general form of affirmative and negative existential propositions may be obtained by using? for the property. Thus we can express existential affirmative proposition as (ɜ x) (f x) and negative existential proposition as || (ɜ x) (f x)

2) One-Predicate General Proposition: One-Predicate General Propositions either affirm or deny a property or an attribute about the whole universe. For example: a) everything is mortal

b) Nothing is permanent.

The first proposition is symbolized as (x) (Mx) and the second proposition is symbolized as (x) (||Px)

3) General Propositions asserting relations between two classes: This proposition states that one class is wholly or partly included in or excluded from another class. For example: a) All lions are animals.

b) No man is perfect

c) Some students are cleaver

d) Some philosophers are not scientists

The traditional categorical propositions i.e. A, E, I, O belong to this category. According to modern logicians both universal and particular propositions belong to general propositions. Modern logicians have tried to bring out the formal structure of general proposition by using quantifies. Thus we can symbolize the above examples as follows.

a) (x) (Lx ɜ Ax)

It means 'Given any x, if x is lion, then x is mortal'.

PDF created with pdfFactory Pro trial version www.pdffactory.com

b) (x) (Mx ɔ || Px)

It means if 'Given any x, if x is man, then x is not perfect'.

c) (ɜ x) (Sx. Cx)

It means 'There is atleast one x such that x is student and x is cleaver'.

d) (ɜ x) (Px . || Sx)

It means 'There is atleast one x such that x is philosopher and x is not student'.

LET US KNOW

Quantifiers are symbols used in predicate logic to signify the quantity of the General propositions. A quantifier is a specific collection of number, objects or persons. Two types of quantifiers are- (1) Universal Quantifier and (2) Existential Quantifier. Universal Quantifier is used to symbolize the universal proposition and Existential Quantifier is used to symbolize the particular proposition. The symbols for the universal quantifier are (x), (y), (z) which means, 'Given any x'. The symbol for the Existential quantifier is '(ɜ x)' which means 'there is at least one x'.

A general proposition is different from a class membership proposition. A general proposition is a proposition about classes. It asserts a relation of inclusion or exclusion between two classes. But a class-membership proposition asserts an individual is a member of a class. A general proposition can be distinguished from a simple proposition. A simple proposition refers to a particular individual. A general proposition can also be distinguished from a compound proposition. A general proposition consists of a single statement but a compound proposition consists of two or more simple propositions.

9.6 SINGULAR AND GENERAL PROPOSITION

There is a clear difference between a singular proposition and a general proposition.

- A singular proposition asserts that the individual possesses a particular property. For example: 'Lata Mangeshkar is a singer', 'Sakuntala is beautiful'. But a general proposition asserts that some individuals or all individuals possess a certain attribute. For example: all men are mortal', 'Some flowers are beautiful'.

PDF created with pdfFactory Pro trial version www.pdffactory.com

- A singular proposition is obtained from a propositional function by the process of instantiation. A singular proposition is a substitution instance of a propositional function. But a general proposition is obtained from a propositional by the process of quantification or generalization.

- The process of symbolization of a singular proposition is different from that of a general proposition. In the symbolization of a singular proposition we use capital letters to symbolize the attributes or properties and small letters to symbolize the individual. For example; 'Socrates is wise' -this singular proposition can be expressed symbolically as 'Ws'

But in the symbolization of a general proposition quantifies are used. For example; 'Everything is perishable'- this proposition can be symbolically expressed by the use of universal quantifier as (x) Px

LET US KNOW

A propositional function is an expression which contains an individual variable and which becomes a proposition when the individual variable is replaced by an individual constant. Propositional functions are neither true nor false. For example; Px (x is a philosopher) is a propositional function. Here 'x' is an individual variable. When this individual variable is substituted by an individual constant 's' we get a singular proposition 'Ps' means 'Socrates is a philosopher'. The process of obtaining singular proposition from a propositional function is called instantiation.

LET US KNOW

Quantification or generalization states that a propositional function is true for all or some of the values of the variables.

9.7 COMPARISON BETWEEN MODERN AND TRADITIONAL CLASSIFICATION OF PROPOSITION

In the light of above discussion we can bring out the following points on the comparison between modern and traditional classification of proposition.

- According to modern logicians there are innumerable kinds of propositions whereas traditional schedule is mainly confined to the four forms of the categorical propositions.

PDF created with pdfFactory Pro trial version www.pdffactory.com

- According to modern logicians the subject and the predicate of a proposition are the constituents of proposition but according to the traditional logicians they are the constituents only.
- According to modern logicians there may be any number of constituents and they may be combined in various ways. But traditional analysis of proposition is limited to two constituents and one mode of combination.

The traditional logicians have completely ignored some kinds of propositions and others are confused. So traditional classification of proposition is based on imperfect analysis and therefore it is unscientific. But in comparison to it modern classification of proposition may be regarded as scientific.

ACTIVITY: 9.1

- Do you find any relationship between the modern and the traditional classification of proposition? Discuss

Ans.....

.....

.....

.....

.....

CHECK YOUR PROGRESS

Q 1: How do modern logicians define proposition?

.....

.....

Q 2: Analse the modern analysis of proposition

.....

.....

Q 3: What are the different kinds of proposition according to modern logic?

.....

Q 4: Distinguish between Class-membership proposition and General proposition.

.....

PDF created with pdfFactory Pro trial version www.pdffactory.com

.....

Q 5:Give example: a) Conjunctive proposition and b) Implicative proposition

.....

Q 6: Do you think the modern classification of proposition is more scientific than traditional classification of proposition?

.....

.....

Q 7:Symbolize the following sentences-

a) All existentialists are philosophers b)Socrates is a philosopher

9.8 LET US SUM UP

- Proposition is the basic unit of logical thinking. By 'Proposition' we mean any statement which must be either true or false, but which can not be both true and false. A proposition is expressed in the form of a sentence; but it is not identical with a sentence. Similarly the truth or falsity of a proposition is determined by the fact, but a proposition is different from a fact. Only indicative sentences can be regarded as propositions because they can be judged to be either true or false.
- Unlike traditional logicians modern logicians do not accept that every proposition must be expressed in the same logical form i.e. subject-copula -predicate. According to modern logicians, there are innumerable kinds of propositions. And a proposition may have any number of constituents and these constituents may be combined in various ways.
- According to modern logicians there are some drawbacks of the traditional classification of proposition. Though traditional logicians try to express all types of proposition in the same logical form, fundamentally they are different in their logical structures. Therefore, there seems to arise some confusion in their classification of proposition. In order to get rid of the defects and limitations of traditional classification of proposition modern logicians attempt to present their classification scientifically.
- According to modern logicians there are three kinds of proposition-

PDF created with pdfFactory Pro trial version www.pdffactory.com

Simple, Compound and General. A simple proposition contains only one statement. A compound Proposition contains two or more simple proposition and General propositions are about classes.

9.9 FURTHER READINGS

1) Chakrabort, Chhanda: 2007. Logic- Informal, Symbolic & Inductive. Prentice Hall of India Pvt. Ltd., New Delhi,

2) Copi, I. M. & Cohen, Carl. 1997.Introduction to Logic, Prentice Hall of India Pvt. Ltd, New Delhi,

3) Stebbing, Susan L. 1969.A Modern Elementary Logic, Methuen & Co. Ltd., London

4) Korde, Ashok & Sawant, Ankush. 1983. Logic. Himalaya Publishing House, Bombay,

9.10 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: According to modern logicians a proposition is a statement which is either true or false. For example; Abdul Kalam is a scientist.

Ans to Q No 2: By the term proposition modern logicians meant a statement which is said to be true or false. The truth or falsity of a proposition is called its truth value. The truth-value of a proposition is determined by the fact. If a proposition represents a fact as it is, then the proposition is true; otherwise it is false. But a proposition is different from a fact. A proposition is expressed in the form of a sentence; it is not identical with a sentence.

Ans to Q No 3: In modern logic, propositions are classified into: Simple, Compound and General. A simple proposition contains only one single statement. It can not be analyzed into other propositions. There are four forms of simple proposition. (1) Subject less proposition (2) Subject-predicate proposition (3) Relational proposition (4) Class-membership proposition.

A compound proposition contains two or more simple statements. There are four forms of compound proposition: Conjunctive proposition, Implicative proposition, Disjunctive proposition and Alternative proposition.

General propositions are non-compound propositions. They are about classes. Such propositions either affirm or deny (1) the existence of

PDF created with pdfFactory Pro trial version www.pdffactory.com

something or (2) a property of the whole universe or the relation between two classes. So there are three kinds of propositions. They are

1) Existential General Proposition

2) One-Predicate General Proposition.

3) General Propositions asserting relations between two classes.

Ans to Q No 4: A Class-membership proposition differs from a General proposition. A class-membership proposition asserts that an individual is a member of a class. For example; Russell is a mathematician. But a General proposition states about classes. It asserts a relation of inclusion and exclusion between two classes. For example; Some philosophers are scientists.

The process of symbolization of a Class-membership proposition is different from that of a general proposition. The above Class-membership proposition can be symbolically expressed as r € P But the above General proposition can be symbolically expressed as

(∋ x) (Px. Sx)

Ans to Q No 5: a) Bertrand Russell was a mathematician and a philosopher

b) If there is tremendous rise in the population then the housing problem will become difficult.

Ans to Q No 6: It can be said that the modern classification of proposition is more scientific than traditional classification of proposition. In support of it we may put forward some reasons. In modern logic we find innumerable kinds of proposition with symbolic expression. By this they have clearly shown the differences of the logical structures of the propositions. But traditional schedule is mainly confined to the four forms of categorical proposition and they should have same logical form for which it becomes difficult to distinguish between quality and relation. Besides it the fundamental difference between various simple propositions and general propositions are not clearly shown in traditional logic.

Ans to Q No 6: a) (x)(Ex ∋ Px) b)s ∈ P

9.10 MODEL QUESTIONS

A) Very short questions

Q 1: What is simple proposition?

PDF created with pdfFactory Pro trial version www.pdffactory.com

Q 2: What are the kinds of simple proposition?

Q 3: Define subject less proposition.

Q 4: Give an example of subject-predicate proposition.

Q 5: Define implicative proposition.

B) Short questions (Answer in about 150 words)

Q 1: Distinguish between simple and compound proposition

Q 2: Distinguish between sentence and proposition

Q 3: Distinguish between subject-predicate proposition and General proposition

Q 4: Distinguish between disjunctive proposition and alternative proposition

Q 5: Distinguish between singular and general proposition.

Q 6: Write a note on General proposition

Q 7: What is general proposition? Briefly explain

Q 8: Do you find any difference between singular and general proposition.

C) Long questions (Answer in about 300-500 words)

Q 1: Describe modern analysis of proposition.

Q 2: Explain modern classification of proposition with examples.

Q 3: Describe the different types of general proposition. Give examples with symbolic expression.

Q 4: Make a comparison between modern and traditional classification of proposition.

****

PDF created with pdfFactory Pro trial version www.pdffactory.com