

Unit 7.1

Terms and Propositions

Nature of propositions

A proposition is a unit of reasoning or logical thinking. Both premises and conclusion of reasoning are propositions. Since propositions are so important, we must know what a proposition is? A proposition is that which is believed to be true or false or doubtful. It is a unit of logical thinking in the sense that it is asserted and expressed in the form of proposition. For example "All men are mortal", "No child is a voter", "Some cats are black", "Ram is a student of this school" etc.

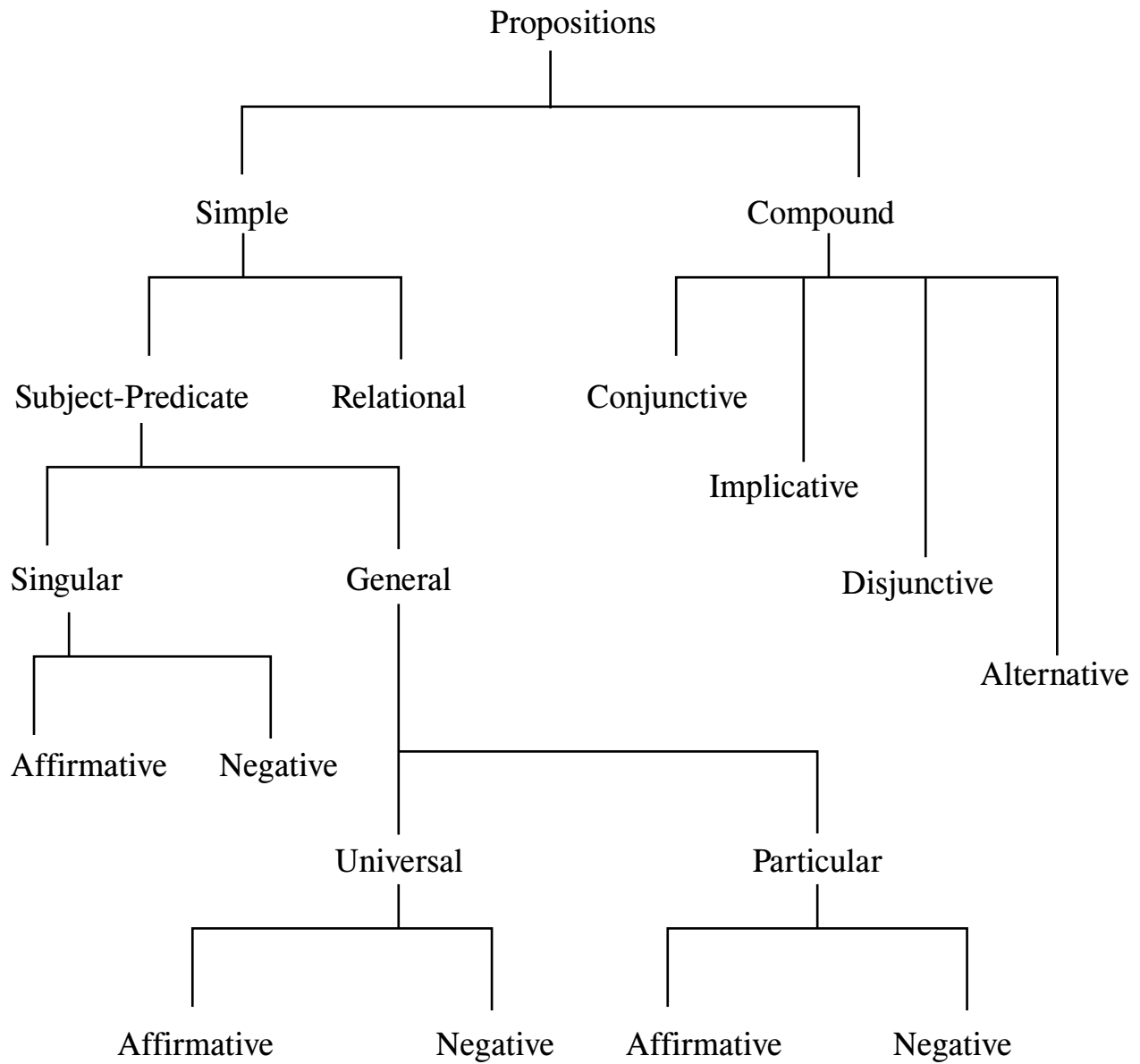
Types of proposition

From the view point of composition and construction propositions are either simple or compound. A simple proposition is a simple sentence having one verb whereas a compound proposition is a combination of two individual propositions. "New Delhi is the capital of India", "Two plus two make four", "Mrs. Indira Gandhi was mother of Rajiv Gandhi", "All voters are citizens" are simple propositions. Compound propositions have at least two simple propositions as components. "Mohan is a student and he is intelligent", "Either it rains, or we shall go for picnic", "If I get ticket, then I will go to see the match".

Classification of propositions

Propositions are classified in many ways. Let us take three classifications. The first classification is general classification of propositions which is based on the composition of propositions. The second classification is the traditional classification of propositions. The third classification is the one accepted by modern logicians.

I. General classification of propositions



(Table - 1)

Types of simple proposition

(i) Subject-Predicate Form:

There are three constituents in subject-predicate form of propositions, viz., subject term, predicate term and a copula. Subject of a proposition is that about which something is said. Predicate of a proposition states something about the subject. Between the subject term and the predicate term of every simple proposition occurs some form of the verb 'to be'. The verb 'to be' serves to connect the subject and the predicate term and is called 'copula'.

Copula is an essential part of every simple proposition. It is the joining link between the subject and the predicate. A proposition is the result of the combination of the subject term with the predicate term. If there is no copula, there is no connecting link between these two terms and consequently there is no proposition. Copula, however, is not a term. In the well-formed proposition copula is put in present tense.

(ii) Singular propositions:

Singular proposition has one definite person or thing or object as a subject. For instance, "Ram is a student of this school", "New Delhi is the capital of India", etc. A singular proposition is affirmative when predicate is assigned to subject. For instance, "Manmohan Singh is the Prime Minister of India". A singular proposition is negative when predicate is denied to subject. For instance, "Bombay is not the capital of India".

(iii) General (class membership) propositions:

The subject of a general proposition indicates a class of objects, persons or events. The terms like 'all' and 'some' designate quantity of subject term and thus are called quantifiers. Quantifiers indicate as to how the subject term is wholly or partially connected to the predicate. For instance, "Some cats are black" indicates that some members of a class 'cat' are 'black.' Whereas in the proposition "All cats are mammals" the quantifier refers to all the members of the subject class 'cat'. The former proposition is particular the latter is universal. Particular proposition is of two types, affirmative and negative. Similarly, universal proposition is of two types, affirmative and negative.

Relational propositions :

Relational propositions, though may be simple, yet there are different from subject - predicate form of propositions. Relational propositions highlight relation between two or among more objects, things, or persons. For instance, "Mrs Indira Gandhi was mother of Rajiv Gandhi". Here relation of mother and son is stated. "Ram told about Sohan to his teacher", highlights relationship among three persons. Relations that hold between two individuals are called 'binary' or 'dyadic' relations. Relations that hold

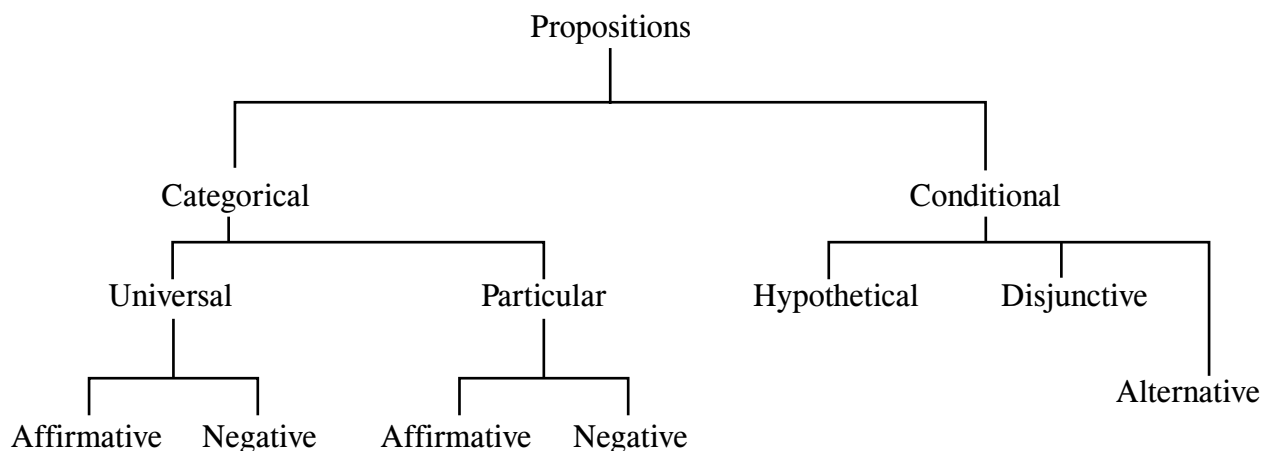
among three individuals or things are called 'triadic relations'. Tetradic relations are expressed by the four elements or things. For instance, "Ram sold his cow to Sohan for a handful of rupees".

Compound propositions:

A compound proposition is constituted of at least two simple propositions. When two simple propositions are joined by 'and', it is called a conjunctive proposition. For instance, "Ram is a student and Mohan is a player." In implicative proposition two simple propositions are joined by 'if, then' relation. For example, "If I get ticket, then I will go to see movie". In disjunctive proposition two simple propositions are joined by 'either, or' relation. For instance, "Either I will take ice cream or I will take chocolate". The alternative compound propositions are also joined by 'either, or' relation. For instance, "Either I will drink tea or I will take coffee". There is, however, difference between disjunctive and alternative propositions. A disjunctive proposition is 'inclusive' sense of 'either, or'. This sense of 'either, or' includes the possibility of both the options such as one may take both ice cream and chocolate at the same time. The 'exclusive' sense of 'either, or' suggests a meaning according to which it is simply 'not both'. Alternative proposition is the exclusive sense of 'either, or'. The example cited above states that either a person will take tea or he will take coffee but not both at the same time. Alternative sense of 'either, or' thus excludes the possibility of both.

II. Traditional Classification of propositions

Aristotle (who had given logic a status of science) and other traditional logicians classified propositions as categorical and conditional. A categorical proposition is stated or asserted unconditionally and a conditional proposition is stated or asserted on certain conditions.



(Table-2)

Categorical propositions:

Categorical propositions are stated without any condition. Here, the predicate is either asserted or denied to the subject without any condition. For instance, "All voters are citizens", "This table is round", "Some students of this college are not Indians" are categorical propositions. For the traditional logicians all simple, singular and unconditional propositions are categorical propositions. They have only one form that is subject - predicate form. A subject-predicate form of a categorical proposition has three constituents, subject term, predicate term and a copula. Besides, the categorical propositions in the traditional classification of propositions have two important elements also, quantity and quality.

Quantity

Quantity refers to the number of members in the class represented by the subject term of a proposition. It may refer to all the members of a class or to some of the members of a class. There are two types of quantities, universal and particular. Subject of a universal proposition indicates unrestricted generalization, and subject of a particular proposition indicates only restricted generalization. For instance, in the proposition, "All men are mortal", the subject term 'men' denotes the entire class of 'man' and the quantity of the proposition is universal. In the proposition "No egg is red", again, the quantity is universal. Here the entire class of eggs is excluded from the entire class of red things. However, when the subject of a proposition indicates only part of a class, the quantity of the proposition is particular. For instance, in the proposition "Some cats are black", the quantity is particular and similarly, in the proposition, "Some roses are not red things", the quantity is particular.

Quality

Quality of a proposition indicates whether a proposition is affirmative or negative. There are two qualities which a proposition can have; affirmative or negative. If a predicate is assigned to subject then quality of the proposition is affirmative. For instance, in the proposition, "All roses are beautiful", the predicate 'beautiful' is assigned to the subject 'roses'. If a predicate is denied to the subject then quality of the proposition is negative. For instance, in the proposition "Some students are not voters" predicate being 'voter' is denied to the subject 'students'. However, a negative term like 'immortal', 'unwise' etc. does not make a proposition negative. It is negative copula which makes a proposition negative. For example, "Some men are illiterate", is an affirmative proposition with a negative predicate whereas "Some men are not literate", is a negative proposition.

Quantity and Quality together give four types of categorical proposition :

1. Universal affirmative----- A
2. Universal negative----- E

3. Particular affirmative----- I

4. Particular negative----- O

In A proposition, "All voters are citizens", quantity is universal and quality is affirmative. In E proposition, "No lion is black", quantity is universal and quality is negative. In I proposition, "Some students are Indian", quantity is particular and quality is affirmative. And in O proposition, "Some Indians are not vegetarians", quantity is particular while the quality is negative.

In the traditional classification of propositions singular propositions are included under universal propositions. In a singular proposition subject is either a proper noun or refers to specific person or object. For example, "Sachin Tendulkar is a good cricketer", "This is a girl's college", "New Delhi is the capital of India" are few instances of singular propositions. No independent status is given to such propositions by the traditional logicians. They are bracketed with universal propositions. "Sachin Tendulkar is a good cricketer" is universal affirmative proposition whereas "Sachin Tendulkar is not a mathematician" is universal negative proposition. This was, however, challenged and criticized by the modern logicians. For them propositions are divided into three categories, singular, categorical and conditional. Why were the singular propositions treated as universal proposition by the classical thinkers? It is because in spite of the fact that the subject term of the singular proposition is a 'specific individual or object', it represents a class, a unit class (one member class). There is only one member in the class referred by the subject 'Sachin' in the proposition "Sachin is a good cricketer". Since the predicate in this proposition is assigned to that very one member of the class, it becomes A proposition. "Sachin Tendulkar is not a mathematician" is E proposition for the similar reason.

The logical form of a categorical proposition in the traditional logic is as follows:

1. Universal affirmative - All S is P - "All cats are mammals", A type proposition.
2. Universal negative - No S is P "No child is a voter", E type proposition.
3. Particular affirmative - Some S is P - "Some students are voters", I type proposition.
4. Particular negative - Some S is not P - "Some roses are not red", O type proposition.

In our day to day life, however, our arguments do not always contain propositions which are in clear and neat logical form. In sciences also universal or particular statements are not in the logical form. But for the logicians the validity of arguments needs the premises and the conclusion (which are also propositions) to be in the standard logical form.

This aim, nevertheless, can be achieved by reducing the non-standard form sentences into logical form of A, E, I, O. In this process the meaning of the propositions should not be lost. In fact the meaning of the proposition is the guide to tell us which type of proposition it is. For instance "Every voter is

citizen" means "All voters are citizens". Similarly, the sentence "Many students of this class are bright children" is "Some students of this class are bright children". "A few politicians are statesmen" is "Some politicians are statesmen" and it is I proposition.

Conditional propositions

A conditional proposition is that in which a predicate is assigned or denied to the subject on certain conditions. For instance, "If it rains in time, then crops will be good", "Sita will not go unless she is invited", "Either I will go to see the match or sit in the coffee house", "If Sohan is graduate, then he is eligible for this post." etc.

Questions

1. Which of the following sentences are propositions?
 - a. God bless us all.
 - b. A mango is fruit.
 - c. It is very hot today.
 - d. Oh! What a beautiful rainbow.
 - e. You should respect your parents.
 - f. No men are perfect.
 - g. Tell me who is the father of nation (India).
 - h. Some students are both intelligent and hardworking.
 - i. Please pass me a spoon.
 - j. Sit down.
2. State in each case the logical form (A, E, I, O) of the propositions:
 - a. All students of this class are healthy children.
 - b. Some roses are red things.
 - c. No fish is mammal.
 - d. Some writers are not scholars.
 - e. All men are mortal.

- f. Some women are literate.
 - g. No circle is square.
 - h. Some men are six feet tall.
 - i. Some fruits are not sweet.
 - j. All snakes are reptiles.
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- 3. Explain traditional classification of propositions.
 - 4. Give an account of quantity and quality of categorical propositions.
 - 5. From the viewpoint of composition and construction categorical propositions are either simple or compound. Illustrate and explain.
 - 6. Explain the nature of singular propositions.
 - 7. Explain with examples relational propositions.
 - 8. Give a brief account of general classification of propositions.
 - 9. Discuss nature and types of conditional propositions with the help of examples.
 - 10. Differentiate General and Traditional classification of propositions.