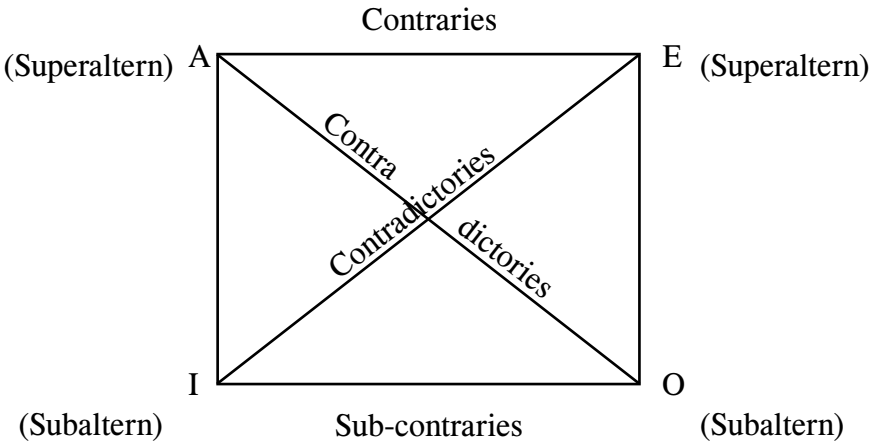
Unit 7.3

Square of Opposition

What is opposition of propositions?

Four categorical propositions A, E, I and O are related and at the same time different from each other. The relation among them is explained by a diagram called the "Square of Opposition". A, E, I and O propositions differ from one another to which the traditional logicians have given a name of 'opposition'. The following diagram shows that opposition:



Two categorical propositions are said to be opposite if they differ in:

1. Quantity
2. Quality
3. Both Quantity and Quality

The pair of AI and EO differs in quantity but not in quality. AI has same quality; both are affirmative but A is universal and I is particular. Similarly EO have same quality; both are negative but E is universal and O is particular. AE and IO differ in quality. Both AE are universal in quantity but A is affirmative and E is negative. Similarly both IO are particular; they have same quantity but I is affirmative and O is negative. The pairs AO and EI, however, differ both in quality and quantity.

Contrary propositions :

> Universal affirmative A proposition, "All S is P" and universal negative E proposition, "No S is P" are related to each other by the contrary relation. The proposition "All basket ball players are tall" is contrary to "No basket ball players are tall". Similarly, "No lion is black" is contrary to "All lions are black".

Sub-contrary propositions :

Particular affirmative I proposition, "Some politicians are well read scholars" is related to O proposition, "Some politicians are not well read scholars" by sub-contrary relation. Similarly O proposition, "Some animals are not carnivorous" is related to I proposition, "Some animals are carnivorous" by sub-contrary relation.

Subaltern and superaltern propositions :

Universal affirmative A proposition, "All army generals are soldiers" is superaltern to I proposition, "Some army generals are soldiers". Similarly, E proposition, "No fish is mammal" is superaltern to O proposition, "Some fish are not mammals". But I is related to A by subaltern and similarly O is related to E by subaltern. "Some cats are mammals" is subaltern to "All cats are mammals." Similarly, "Some roses are not red things." is subaltern to "No roses are red things."

Contradictory propositions :

The universal affirmative A proposition, "All S is P" is related to particular negative O proposition, "Some S is not P" by contradictory relation. The contradictory of "All men are mortal" is "Some men are not mortal" and vice versa. The contradictory of E proposition, "No egg is red" is I proposition, "Some eggs are red".

1. "All S is P" is contrary to "No S is P" and vice versa.
2. "Some S is P" is sub-contrary to "Some S is not P" and vice versa.
3. (i) "All S is P" is contradictory to "Some S is not P" and vice versa.
   (ii) "No S is P" is contradictory to "Some S is P" and vice versa.
4. (i) "Some S is P" is subaltern to "All S is P".
   (ii) "Some S is not P" is subaltern to "No S is P".
5. (i) "All S is P" is superaltern to "Some S is P".
   (ii) "No S is P" is superaltern to "Some S is not P".

Each opposite relation has certain characteristics

Contrary proposition A and E cannot be both true together though they both can be false at the same time. If one of the contrary propositions is true, then the other contrary proposition is false. But if one of the contrary propositions is false then the other contrary proposition is undetermined (it can be true or it can be false also). If "All politicians are honest" is false, then "No politician is honest" can be false, or, it can be true also.

Sub-contrary propositions I and O cannot both be false together though they both can be true together. If I is true, O is undetermined; whereas if I proposition is false, O is necessarily true. Similarly, if O is true, I is undetermined but if O is false, I is definitely true.

Subaltern relationship shows if A is true, then I is necessarily true, but if I is true, A remains undetermined. Same is the case with E and O. If E proposition "No S is P" is true, then O proposition "Some S is not P" is also true but not the other way round.

Contradictory relation between A and O, and also between E and I is of strict opposition. If A is true, O is false; if O is true, A is false. Similarly, if E is true, I is false and if I is true, E is false.

(i) If A proposition is given as true, then it implies :

E proposition is false

I proposition is true

O proposition is false

(ii) If A proposition is given as false, then it implies:

E proposition is undetermined (can be true or can be false also)

I proposition is undetermined (can be true or can be false also)

O proposition is true

(iii) If E proposition is given as true, then it implies:

A proposition is false

I proposition is false

O proposition is true

(iv) If E proposition is given as false, then it implies:

A proposition is undetermined (can be true or can be false also)

I proposition is true

O proposition is undetermined (can be true or can be false also)

(v) If I proposition is given as true, then it implies:

A proposition is undetermined (can be true or can be false also)

E proposition is false

O proposition is undetermined (can be true or can be false also)

(vi) If I proposition is given as false, then it implies :

A proposition is false

E proposition is true

O proposition is true

(vii) If O proposition is given as true, then it implies:

A proposition is false

E proposition is undetermined (can be true or can be false also)

I proposition is undetermined (can be true or can be false also)

(viii) If O proposition is given as false, then it implies:

A proposition is true

E proposition is false

I proposition is true

In "Square of Opposition", one important point should be noticed, that is, in order to find out the opposite relations from a given proposition, the subject and the predicate of both the given and the inferred propositions should remain the same, as shown in the following examples:

Example 1: Contrary, contradictory and subaltern of A proposition: "All children are innocent beings" are as follows :

Contrary "No child is innocent being" (E)

Contradictory "Some children are not innocent beings" (O)

Subaltern "Some children are innocent beings" (I)

Example 2: If "Some athletes are healthy persons" (I) is true, then it can be inferred about its opposites as follows :

Sub-contrary "Some athletes are not healthy persons" (O) is undetermined.

Contradictory "No athletes are healthy persons" (E) is false.

Superaltern "All athletes are healthy persons" (A) is undetermined.

Questions

1. Find contrary / sub-contrary, contradictory and subaltern / superaltern of the following propositions:
   a. All old men are wise.
   b. Some physicians are humanitarians.
   c. Some rich persons are not happy persons.
   d. No military men are expert in social legislation.
2. If "No lion is black" is true, then what can be said about the truth/falsity of its opposite propositions?
3. If "All scientists are women" is false, then what can be said about the truth/falsity of its opposite propositions?
4. If "Some students are voters" is true, then what can be said about the truth/falsity of its opposite propositions?
5. If "Some women are soldiers" is false, then what can be said about the truth/falsity of its opposites?
6. Both the contrary propositions (A,E) can be false together but they cannot be true together, Explain with the help of examples.
7. Both the sub-contrary propositions (I,O) cannot be false together though both can be true together. Discuss with the help of examples.
8. Can the pair of contradictory propositions be false together or true together? Examine.
9. Four types of categorical propositions (A,E,I,O) are related to each other through the relation of opposition, Explain.
10. Draw square of opposition showing all the opposite relations.