CHAPTER 13

Deductions and Connectives

In a number of competitive exams, there will be a few questions on "deductions". Typically, here each question consists of two statements—on the basis of which a deduction has to be made. The answer has to be chosen from the given four (or five) choices and that will be the deduction made.

(If no conclusion can be drawn or the answer is not obtained, then the choice has to be marked which will normally be worded as "none of the above").

These questions can be answered by representing the given statements by Venn Diagrams. However, here we will look at arriving at the deduction by using some simple rules.

First, let us look at some basic terms used in the rules and understand what they mean.

The two statements given in the question are called 'premises' and the answer, the conclusion.

E.g., All dogs are cats -- (i)

All cats are Rabits -- (ii)

These two statements are called 'premises.'

Conclusion: All dogs are Rabits.

The premises normally start with the words All, No, Some and Some - Not.

The word "All" has its synonyms as—Every, Any, Each, whereas the word "Some" can also be replaced by Many, Few, A little, Most of, Much of, More, etc.

These words are referred to as qualifiers (also termed as quantifiers).

A premise consists of a subject and a predicate wherein the first term [e.g., "dogs" in statement (i)] is the subject and the second term [e.g., "cats" in statement (i)] the predicate. Similarly, in statement (ii), "cats" is called the subject and "Rabits" is the predicate.

The word that occurs in both the premises is known as the 'middle term' ("cat" in the example, given above). The answer or "conclusion" should consist of the other two words ("dogs" and "Rabits" in the above example) and the middle term should not appear in the answer.

The premises can be divided into

(a) Universal statements and
(b) Particular statements

This classification of the premises into the above categories is dependent on the qualifier used in the premise. For example, the statements where "All" is used are called Universal statements and the statements where "Some" is used are called Particular statements.

Premises can also be divided into

(i) Positive (affirmative) statements and
(ii) Negative statements.

If there is a negative term like "not" or "no" in the statement, it is called a negative premise. Otherwise, it is called a positive premise or an affirmative statement.

The combination of the two different categories of classifications leads to four different premises as given in Table I below.

TABLE 1

	Affirmative	Negative
Univeral	All A	No E
Particular	some; many I	some not; many not O

The subject or the predicate can be either distributed or not distributed in the given premise.

The subject and the predicate are either distributed (✓) or not distributed (x) depending on what kind of a statement it is (particular affirmative etc.). Table II shows the distribution pattern of the subject and the predicate.

TABLE 2

	Subject	Predicate
Universal affirmative	✓	×
Universal negative	✓	✓
Particular affirmative	×	×
Particular negative	×	✓

Note: ✓ indicates distributed.
× indicates undistributed.

Rules for Deductions

[1] Every deduction should contain three and only three distinct terms.
[2] The middle term must be distributed at least once in the premises.
[3] If one premise is negative, then the conclusion must be negative.
[4] If one premise is particular, then the conclusion must be particular.
[5] If both the premises are negative, no conclusion can be drawn.
[6] If both the premises are particular, no conclusion can be drawn.
[7] No term can be distributed in the conclusion, if it is not distributed in the premises.

We take examples of each type and look at them in detail.

Example – I

All dogs are cats. -- (i)
All cats are Rabits. -- (ii)

As the first statement is a Universal affirmative statement, the subject (dogs) has to be distributed (✓) and the predicate (cats) is not distributed (x). As the second statement is also Universal affirmative, the subject cat is distributed (✓) and the predicate Rabits is not distributed (x). The above answer/logic is arrived at on the basis of Table II.

The middle term ("cats" is the middle term as it occurs in both the premises) is distributed once in the premises. Hence it satisfies Rule [2]. As "dogs" is distributed in the premise and "Rabits" is undistributed in the deduction also, they should appear accordingly. The type of statement that satisfies both of them is Universal affirmative statement, i.e., a statement with "All". Hence the answer will be

All dogs are Rabits.

The answer cannot be 'All Rabits are dogs', because Rule [7] states that no term can be distributed in the conclusion if it is not distributed in the premises. As "Rabits" is not distributed in the premise, it cannot be distributed in the conclusion (because if we take "All Rabits are dogs", then the subject "Rabits" will be distributed). Hence, the conclusion "All Rabits are dogs." is wrong.

Example – II

All cats are dogs. -- (i)
All cats are Rabits. -- (ii)

Statement (i) is Universal affirmative and hence the subject "cats" is distributed and the predicate "dogs" is not distributed as per Table II.

Statement (ii) is also Universal affirmative and hence the subject "cats" is distributed and the predicate "Rabits" is not distributed as per Table II.

Here, the middle term "cats" ("cats" is the middle term as it is occurring in both the premises) is distributed; hence we can draw a conclusion.

The answer should contain the terms "dogs" and "Rabits" and both the terms are not distributed. Referring to Table II, we find that this is possible only in Particular affirmative [the conclusion cannot start with the qualifier 'All' as the subject in "All" should be distributed]. According to Rule 7, a term cannot be distributed in the conclusion if it is not distributed in the premises. So the answer will be

Some dogs are Rabits.
or
Some Rabits are dogs.

Example – III

All dogs are cats. -- (i)
All Rabits are cats. -- (ii)

Statement (i) is a Universal affirmative and hence the subject "dogs" is distributed and the predicate "cats" is not distributed. In statement (ii), which is also a Universal

affirmative, the subject "Rabits" is distributed and the predicate "cats" is not distributed. This is arrived at on the basis of Table II.

The middle term "cats" ["cats" is the middle term as it occurs in both the statements] is not distributed in either of the two statements. From Rule [2], which states that the middle term should be distributed at least once in the premises for drawing a conclusion, we cannot draw any conclusion in this case.

Example – IV

All cats are dogs. -- (i)
Some cats are Rabits. -- (ii)

The first statement is a Universal affirmative premise and hence the subject "cats" is distributed and the predicate "dogs" is not distributed (x). The second statement is Particular affirmative and hence both the subject "cats" and the predicate "Rabits" are not distributed (x) as per Table II. As we have a particular premise, the conclusion should also be a particular one as per Rule [4]. The middle term is distributed, hence we can draw a conclusion. So the answer will be

Some dogs are rabits.
or
Some rabits are dogs.

Example – V

All dogs are cats. -- (i)
No cats are Rabits. -- (ii)

As the first premise is a Universal affirmative, the subject (dogs) is distributed and the predicate (cats) is not distributed. In the second premise, which is a Universal negative, the first term (cats) and the second term (Rabits) are both distributed (as per Table II). As the middle term is distributed at least once in the premises, Rule [2] is satisfied and hence we can draw a conclusion.

From Rule [3], which states that if one of the premises is negative the conclusion should be negative, the conclusion should be negative and as both the terms "dogs" and "Rabits" are distributed, the conclusion should be a Universal negative statement. Hence the answer will be

No dogs are rabits.
or
No rabits are dogs.

Example – VI

All dogs are cats. -- (i)
Some cats are Rabits. -- (ii)

Since the first statement is a Universal affirmative, "dogs" is distributed and "cats" is not distributed. Since the second statement is a Particular affirmative, "cats" is not distributed and "Rabits" is also not distributed (as per Table II).

In the above given example, no conclusion can be drawn, as Rule [2] states that the middle term ("cats" in the above example as it occurs in both the premises) should be distributed at least once in the premises, which is not satisfied.

Example – VII

All dogs are cats. -- (i)
Some cats are not rabits. -- (ii)

The first statement is a Universal affirmative and hence the subject (dogs) is distributed and the predicate (cats) is not distributed.

The second statement is a Particular negative and hence the subject (cats) is not distributed and the predicate (Rabits) is distributed (Table II).

But as the middle term (cats) is not distributed at least once in the premises, Rule [2] is not satisfied and hence we cannot draw any conclusion.

Example – VIII

All cats are dogs. -- (i)
Some cats are not rabits. -- (ii)

The first statement is a Universal affirmative and hence "cats" is distributed and "dogs" is not distributed. The second statement is a Particular negative and hence "cats" is not distributed and "Rabits" is distributed (as per Table II).

Here, the middle term (cats) is distributed and hence we can draw a conclusion.

The conclusion should be Particular negative as Rule [3] states that if a premise is negative, the conclusion should also be negative. Also Rule [4] states that if a premise is Particular, the conclusion should also be Particular. Hence, the conclusion should be a Particular negative.

In Particular negative, we know that the subject is not distributed and the predicate is distributed.

The terms "dogs" and "Rabits" should come in the conclusion. Also, since "dogs" is not distributed in the premise, it cannot be distributed in the conclusion, as per Rule [7].

As per the above reasoning, only "Rabits" can be the predicate in the conclusion and hence "dogs" will be the subject.

Thus the answer will be - Some dogs are not Rabits.

Example – IX

No dogs are cats. -- (i)
No cats are rabits. -- (ii)

We cannot draw any conclusion, as Rule [5] states that if both the premises are negative, we cannot draw any conclusion.

Example – X

No dogs are cats. -- (i)
Some cats are not rabits. -- (ii)

As both the premises are negative, hence, as per Rule [5], we cannot draw any conclusion.

(Please note that the first premise is a Universal negative and hence the subject (dogs) is distributed and the predicate (cats) is also distributed as per Table II.

The second statement is a Particular negative and hence the subject (cats) is not distributed and the predicate (Rabits) is distributed as per Table II).

Example – XI

Some cats are not Rabits. -- (i)
Some cats are dogs. -- (ii)

As the first premise is a Particular negative, the subject (cats) is not distributed and the predicate (Rabits) is distributed. In the second premise, both the subject and the predicate (cats and dogs respectively) are not distributed, since the premise is a Particular affirmative (as per Table II).

No conclusion can be drawn, as both the premises are particular as per Rule [6].

Example – XII

Some cats are not dogs. -- (i)
Some cats are not rabits. -- (ii)

We cannot get an answer from the two premises, as Rule [5] states that from two negative premises, no conclusion can be drawn. Also, Rule [6] states that from two particular premises, no conclusion can be drawn.

Logical Connectives

In Logic, we deal with statements that are essentially sentences in English language. However, in Logic we are not interested in or worried about the factual correctness of the sentence. We are interested only in the Logical "truthfulness" of the statements.

For example, consider the statement:

"If the sun rises in the west, then the moon rises in the north."

Here, we are not concerned with whether the sun rises in the east or west or with the direction in which the moon rises. We will only look at whether the moon will rise in the north or not *depending* on whether the part of the statement "The sun rises in the west" is true or not. If we are *given* that the sun rises in the west (which is factually incorrect), we can then conclude that the moon rises in the north (which again does not concern with the direction in which the moon actually rises).

We can represent statements in Logic using symbols like p, q, etc., the way we represent variables/unknowns in Algebra using symbols like x, y, z, etc.

Statements like "I will go for a movie", "It is a sunny day", etc., are called *simple statements*. When two or more such simple statements are connected together to form a single statement, such a statement is called a *compound statement*.

The simple statements are combined using *logical connectives* to form compound statements. We should know some of the important logical operators/connectives to be able to effectively tackle questions that involve compound statements and logical operations on compound statements.

Negation ("NOT")

Any statement can be negated by using the words "not" or "no." In layman's language, negation is like the opposite of a statement.

For example, the negation of the statement "It is raining" is "It is NOT raining."

The negation of the statement "He will pass the exam" is "He will not pass the exam." This is equivalent to saying "He will FAIL in the exam." So, when you are looking at negating the given statement, you should keep in mind the English equivalents of the statements also.

Logical Connective OR

Two or more statements can be connected using the connective OR. The following is an example using OR.

It is raining or I will go to my friend's house.

The same statement can also be written as

Either it is raining or I will go to my friend's house.

Both the statements above mean the same. The additional word "either" does not change the meaning of the statement.

When two (or more) statements are connected using OR, *at least one of them is true.*

Suppose we have a statement "Either p or q," since at least one of the two statements p, q must be true, we have

p *alone* is true or q *alone* is true or *both* are true.

This is the interpretation to be given to an OR statement (irrespective of the meaning of the sentence as per English language).

For example, the statement "Either I will go to a movie or I will go to my friend's house" means

I will go to a movie
or
I will go to a friend's house
or
I will go both for a movie and to a friend's house

Hence, we will always interpret the statement "(Either) p or q" as "P alone is true or q alone is true or both are true" (unless otherwise explicitly stated that *both* are not true at the same time). In other words, in a statement "p or q", we can say that *at least* one of the two statements is true.

Given "p or q", we get four different possibilities that follow:

Given "p or q", we are then told "p is true":

Since we need at least one of the two statements p or q to be true and here we already know that p is true, we *cannot* conclude anything about q, that is, we cannot conclude whether q is true or false—both possibilities exist.

Given "p or q", we are then told "q is true":

Since we need at least one of the two statements p or q to be true and here we already know that q is true, we *cannot* conclude anything about p, that is, we cannot conclude whether p is true or false—both possibilities exist.

iii) Given "p or q", we are then told "p is NOT true":
Since we need at least one of the two statements p or q to be true and here we already know that p is not true, q *has* to be true so that *at least* one of the two statements will then be true. So, here we *can* conclude that q is true.

iv) Given "p or q", we are then told "q is NOT true":
Since we need at least one of the two statements p or q to be true and here we already know that q is not true, p *has* to be true so that *at least* one of the two statements will then be true. So, here we *can* conclude that p is true.

Let us take an example and understand these quetions:

"Each question has a main statement followed by four statements labelled A, B, C and D. Choose the ordered pair of statements where the first statement implies the second, and the two statements are logically consistent with the main statement."

1. Either the elephant is big or the lion is cruel.
   A. The elephant is big.
   B. The elephant is not big.
   C. The lion is cruel.
   D. The lion is not cruel.
   (1) AC (2) DB
   (3) BC (4) AD

☝ ***Solution:*** The main statement has two simple statements "The elephant is big" and "The lion is cruel" connected by "OR." Let us call these two statements p and q respectively for the purpose of our discussion. Then the main statement can be represented as "p OR q."

First, let us look at each choice and understand the logic discussed above. ONCE WE DO THAT, WE WILL ALSO SEE HOW TO ANSWER SUCH QUESTIONS IN A MUCH SHORTER TIME.

At least one of these two statements has to be true in any ordered pair we look at. As per the discussion we had above, from among the choices, if we have an ordered pair where the first part of the ordered pair in the choice is one of the two statements true, then we cannot conclude anything about the second part of the ordered pair. However, if the first part of the ordered pair in the choice is NOT true, then the second part should contain the second statement as given in the main statement (that is, the second statement has to be "true").

Take choice (1) for the above question. The first statement is A which says "The elephant is big." This is p (as we denoted above) which is given in the main statement. Since p is true, we cannot conclude whether q is true or not, that is, q may be true or it may be false. So, we CANNOT have any statement following A which can be concluded from A and is consistent with the main statement. Hence this cannot be the answer choice.

Take choice (2). The first statement is D which says "The lion is not cruel." This is the NEGATION of statement q, that is to say, "Not q" is the first of the two statements in the choice. Since q is negated, p MUST be true (for at least one of the two statements to be true). But the second statement in this choice is "The elephant is not big" which is "Negation p." Hence, this is not the correct choice.

Take choice (3). The first statement is B which is "The elephant is not big," that is, Negation p. Since p is negated, q must be true (for at least one of the two statements to be true). The second statement in the choice is C which is "The lion is cruel," that is, q. Thus, in this choice, we have Negation p followed by q. So, this is the correct answer choice.

Let us also take a look at choice (4). The first statement in this choice is A which is "The lion is big," that is, p is true. Since the first statement is true, we cannot conclude anything about statement q.

Approach in the exam

In an exam, for these types of questions, we do not need to go from the answer choices and check each and every one of them. We can directly identify the correct combinations of statements that will satisfy the directions given.

We know that if the first statement out of the two statements in the choice is either p or q (that is one of the two statements given in the question, then we cannot draw any conclusion.

We also know that if p or q is negated, then the other statement should definitely be true. So, "Negation p

followed by q" and "Negation q followed by p" will be correct combination of statements. Hence, we directly check out for NOT p—q or NOT q—p in the answer choices.

In the above example, we should look for BC or DA.

Logical Connective AND

Two or more statements can be connected using the connective AND. The following is an example using AND.

It is raining and I will go to my friend's house.

The two statements connected by and have to be true for the compound statement to be true. In general, if we have a statement "p and q" then we can conclude that p should be true as well as q, that is, both the statements should be true. Even if one of the two statements is false, the compound statement is false.

Negation of compound statements formed with OR, AND

A compound statement formed with OR or AND can be negated in the following manner:

"Negation (p OR q)" is the same as "Negation p AND Negation q."

"Negation (p AND q)" is the same as "Negation p OR Negation q."

As can be seen in the above example, when a compound statement consisting of two simple statements (connected with OR or AND) is negated, the result will consist of each of the individual statements negated. In addition to that, the following will also have to be observed:

OR will become AND

AND will become OR

Logical connective IF—THEN

This is a very important connective. This is represented by $p \rightarrow q$ (and is read as "p implies q"). This means that if we know that p has occurred, q has to occur or must have occurred. For example, the statement "If it is raining, then I wear a raincoat" means that if we know that it is raining, we can conclude that I must be wearing a raincoat.

The statement "p implies q" is called an implication statement. The term on the left hand side in $p \rightarrow q$ is called the "antecedent" and the term q is called the "consequent".

Let us look at the following cases when we are given that $p \rightarrow q$

i) Given that $p \rightarrow q$, we are then told that q has occurred. Can we conclude that p must have occurred?

We CANNOT conclude that p must have occurred. This is because while whenever p occurs, q will definitely occur, q may occur even otherwise, that is, even without the occurrence of p. So, both p and Negation p are possible and hence, we cannot conclude anything when we know that q has occurred.

ii) Given that $p \rightarrow q$, we are then told that p has not occurred. Can we conclude that q will also not occur?

We CANNOT conclude that q will not occur. This is because while whenever p occurs, q will definitely occur, q may occur even p does not occur (as discussed above). So, both q and Negation q are possible, and hence we cannot conclude anything when we know that p has not occurred.

iii) Given that $p \rightarrow q$, we are then told that q has not occurred. Can we conclude that p must not have occurred?

We CAN conclude that p must not have occurred. This is because had p occurred, q WOULD have occurred but we know that q has not occurred. So, p MUST NOT have occurred. So, we can conclude that "Negation p" follows "Negation q."

So, if we are given that $p \rightarrow q$, then "Negation $q \rightarrow$ Negation p." This is a very important relationship. We can express it in words as

"In an implication statement, negation of the right hand side will always imply the negation of the left hand side."

We can summarize the above three points as follows:

$p \rightarrow q$	Given
$q \rightarrow p$ $q \rightarrow$ Negation p	Cannot be concluded Cannot be concluded
Negation $p \rightarrow$ Negation q Negation $p \rightarrow q$	Cannot be concluded Cannot be concluded
Negation $q \rightarrow$ Negation p	Is always true

Let us take an example and understand these questions. The directions are the same as that we looked at above, that is,

"Each question has a main statement followed by four statements labelled A, B, C and D. Choose the ordered pair of statements where the first statement implies the second, and the two statements are logically consistent with the main statement."

2. If the elephant is big then the lion is cruel.

A. The elephant is big.
B. The elephant is not big.
C. The lion is cruel.
D. The lion is not cruel.

(1) CA (2) BD
(3) BC (4) DB

Solution: The main statement has two simple statements "The elephant is big" and "The lion is cruel" connected by "IF—THEN." Let us call these

two statements p and q respectively for the purpose of our discussion. Then the main statement can be represented as "p implies q" or "p→q."

First, let us look at each choice and understand the logic discussed above. ONCE WE DO THAT, WE WILL ALSO SEE HOW TO ANSWER SUCH QUESTIONS IN A MUCH SHORTER TIME.

Take choice (1). In terms of p and q, this can be represented as $q \rightarrow p$. As per the table above, we know that this CANNOT be concluded given $p \rightarrow q$. Hence, this is not the correct answer.

Take choice (2). In terms of p and q, this can be represented as "Negation $p \rightarrow$ Negation q." Again, as per the table above, we know that this CANNOT be concluded given $p \rightarrow q$. Hence, this is not the correct answer.

Take choice (3). In terms of p and q, this can be represented as "Negation $p \rightarrow q$." As per the table above, we know that this CANNOT be concluded given p→q. Hence, this is not the correct answer.

Since we eliminated three answer choices, the fourth has to be the correct answer. Let us take choice (4) and look at it. In terms of p and q, it can be represented as "Negation $q \rightarrow$ Negation p." As per the table above, we know that this can definitely be concluded. Hence, this is the correct answer choice.

Approach in the exam

In an exam, for these types of questions, we do not need to go from the answer choices and check each and every one of them. We can directly identify the combinations of statements that will satisfy the directions given.

Given that $p \rightarrow q$, we know that "Negation $q \rightarrow$ Negation p." Hence, the two correct combinations are "pq" (because this is the given statement itself) and "Negation q--Negation p."

So, in the above example, we should look for AC or DB. Hence, the correct answer is choice (4).

Other forms of IF—THEN

There are different types of statements which can be reduced to or represented as p→q. Let us look at these statements in descriptive form and the representation by using "→" sign.

S. No.	Statement	Representation using →	Also equivalent to	Remarks
1.	If p then q	$p \rightarrow q$	Neg. $q \rightarrow$ Neg. p	Already discussed above
2.	q if p	$p \rightarrow q$	Neg. $q \rightarrow$ Neg. p	Identical to 1 above
3.	When p, then q Whenever p, then q	$p \rightarrow q$	Neg. $q \rightarrow$ Neg. p	Identical to "if p then q"
4.	q when p q whenever p	$p \rightarrow q$	Neg. $q \rightarrow$ Neg. p	Same as 3 above
5.	Everytime p, q	$p \rightarrow q$	Neg. $q \rightarrow$ Neg. p	Same as "If p, then q"
6	q everytime p	$p \rightarrow q$	Neg. $q \rightarrow$ Neg. p	Same as 5 above
7.	q only if p	$q \rightarrow p$	Neg. $p \rightarrow$ Neg. q	
8.	Unless p, q	Negation $p \rightarrow q$	Neg. $q \rightarrow p$	
9.	q unless p	Negation $p \rightarrow q$	Neg. $q \rightarrow p$	Same as 8. Above
10.	p otherwise q	Negation $p \rightarrow q$	Neg. $q \rightarrow p$	Same as "Unless p, q"

PRACTICE EXERCISE 13 (A)

Directions for questions 1 to 3: Each of the following questions contains a pair of statements. Consider the statements to be true even though they are at variance from the commonly known facts. Find out few possible conclusions that can be logically drawn from these statements.

1. All rupees are notes.
All notes are papers.

2. Some countries are islands.
No islands are drought prone.

3. All mixers are grinders.
Some mixers are not juicers.

Directions for questions 4 to 6: In each of these questions, two statements are given followed by two conclusions numbered I and II. Consider the given statements to be true even if they seem to be at variance from the commonly known facts. Read the conclusion and then decide which of the conclusion(s) logically follow(s) from the given statements. Mark your answer as

(1) if only I follows.
(2) if only II follows.
(3) if both I and II follow.
(4) if neither I nor II follows.

4. Statements:
Some lands are fertile
Some fertile are not cultivable.

Conclusions:
I. Some lands are not cultivable.
II. No cultivable is land.

5. Statements:
Some sugars are powder.
All sugars are fattening.

Conclusions:
I. All powders are fattening.
II. Some fattening are powders.

6. Statements:
All melodies are classical.
Some swaras are not classical.

Conclusions:
I. Some melodies are not swaras.
II. Some swaras are not melodies.

Directions for questions 7 to 9: Each of these questions consists of six statements followed by four sets of three statements each. Select as your answer the set in which the third statement logically follows the first two statements.

7. A. No mute is deaf.
B. Some deaf persons are not dull.
C. All dull persons are mute.
D. Some dull persons are mute
E. No deaf person is mute.
F. No deaf person is dull.
(1) FAD (2) DAB
(3) CAF (4) FCE

8. A. No artificer is a craftsman.
B. All artificers are artisans.
C. Some artisans are not craftsman.
D. Some artisans are sculptors.
E. Some sculptors are not craftsman.
F. Some artificers are sculptors.
(1) ABC (2) CDE
(3) DBF (4) CED

9. A. Some rifles are not pistols.
B. All cannons are guns.
C. No gun is a pistol.
D. Some cannons are rifles.
E. Some guns are rifles.
F. Some guns are not rifles.
(1) BDF (2) ECA
(3) ACE (4) CFA

Directions for questions 10 to 12: Each of these questions consists of six statements followed by four sets of three statements each. Select as your answer the set in which the statements are logically related.

10. A Some tufts are combs.
B. All crests are combs.
C. No crest is tuft.
D. All crests are tufts.
E. Some crests are not combs.
F. Some tufts are not combs.
(1) ABD (2) ABC
(3) EDA (4) BCF

11. A. Some desks are not decks.
B. No slope is desk.
C. Some slopes are desks.
D. No desk is a deck.
E. No slope is decks.
F. All desks are slopes.
(1) CDE (2) DEF
(3) ABE (4) BDE

12. A. Engineers are not doctors.
B. Some doctors are psychologists.
C. Some doctors are not professors.
D. Some engineers are professors.
E. No professor is a psychologist.
F. Some psychologists are not engineers.
(1) ACD (2) DEF
(3) BFA (4) None of the above

Directions for questions 13 and 14: These questions are based on the following statements.

All booths are cabins.
Some dens are not cabins.
All hovels are booths.

13. Which of the following statement contradicts the conclusion of the above three statements?
(1) All dens are hovels.
(2) Some dens are hovels.
(3) Some dens are not hovels.
(4) No den is a hovel.

14. If few kraals are hovels, then which of the following is definitely false?
(1) Few dens are not kraals.
(2) Few kraals are not dens.
(3) Few kraals are dens.
(4) No kraal is a cabin.

Directions for questions 15 and 16: These questions are based on the following statements.

No individuality is a character.
Few characters are peculiarities.
Personality is individuality.

15. Which of the following statements contradicts the conclusion of the above three statements?
(1) All personalities are peculiarities
(2) All peculiarities are personalities
(3) No personalities are peculiarities
(4) Few peculiarities are personalities.

16. If no personality is unicity, then which of the following is definitely true?
(1) Unicity is peculiarity.
(2) Few unicities are peculiarities
(3) No unicity is peculiarity.
(4) None of these

Directions for questions 17 and 18: In each of the following questions, select the option which is definitely true based on the given statements.

17. In an organization, all the managers have cars but no manager has a bike. All persons who have cars are executives.
(1) All executives have bikes.
(2) No executive has bike.
(3) Some executives do not have bikes.
(4) Some executives have bikes.

18. In a school, all the intelligent students are sharp as well as clever. All the students who are clever score more than 90% marks and no dull student is clever.
(1) Few dull students are intelligent.
(2) No sharp student is dull.
(3) No dull student scores more than 90% marks.
(4) Few sharp students are not dull.

Directions for questions 19 to 22: Each question below consists of a main statement followed by four numbered statements. From the numbered statements, select the one that logically follows the main statement.

19. If Sania wins, then her rank improves.
(1) Sania's rank improved, implies that she won.
(2) Sania did not win, hence her rank does not improve.
(3) Sania's rank did not improve, implies that she did not win.
(4) Sania won, hence her rank will not improve.

20. Whenever the parents are away, I freakout.
(1) I freaked out, means that the parents are away.
(2) Parents are away, hence I will freakout.
(3) Parents are not away, hence I will not freakout.
(4) Both (2) and (3)

21. Either India wins ODI or loses tests.
(1) India lost the ODI implies that it wins tests.
(2) India won the tests implies that India wins ODI.
(3) India did not win ODI, hence it loses tests.
(4) India did not lose tests, means that India loses ODI.

22. Only if the aesthetic sense prevails, then corruption vanishes.

(1) Aesthetic sense prevailed, means that corruption vanished.
(2) Corruption did not vanish, implies that aesthetic sense did not prevail.
(3) Aesthetic sense did not prevail, hence corruption vanishes.
(4) Corruption vanished, implies that aesthetic sense prevailed.

Directions for questions 23 to 27: In each question, there is a main statement followed by four statements A, B, C and D. From the choices, choose the ordered pair in which the first statement implies the second statement and the two are logically consistent with the main statement.

23. If you attend the party, then I will introduce you to them.

A. You have attended the party.
B. You did not attend the party.
C. I will introduced you to them.
D. I will not introduced you to them.

(1) AB (2) BD
(3) CA (4) DB

24. Either Ram or Laxman will deliver the book.

A. Ram delivered the book.
B. Laxman delivered the book.
C. Ram did not deliver the book.
D. Laxman did not deliver the book.

(1) BC
(2) DA
(3) CD and AB
(4) CB and AD

25. Unless your will is strong, you will not fulfil.

(A) Your will is not strong.
(B) You will not fulfil.
(C) Your will is strong.
(D) You will fulfil.

(1) AB (2) CD
(3) BA (4) AD

26. The government will be in place, only if there is fair poll.

(A) The government is not in place.
(B) There is fair poll.
(C) The government is in place.
(D) There is no fair poll.

(1) AD
(2) BC
(3) BD
(4) CB

27. Lara creates history, whenever he is in form.

(A) Lara is not in form.
(B) Lara did not create history.
(C) Lara creates history.
(D) Lara is in form.

(1) CD
(2) BA
(3) CD and AB
(4) DC and BA

Directions for questions 28 to 30: Each question given below is a statement followed by four different statements. Choose the one which is the correct negation of the given statement.

28. Either Anand will marry Vandana or Madhavi will marry Kollol.

(1) Anand does not marry Vandana, so Madhavi marries Kollol.
(2) Neither Anand marries Vandana nor Madhavi marries Kollol.
(3) Madhavi does not marry Kollol but Anand marries Vandana.
(4) None of these

29. Whenever Bhiru and Basanti go for long drive, Joy follows them.

(1) Joy follows Bhiru and Basanti but they are not going for a long drive.
(2) Bhiru and Basanti are going for long drive and Joy follows them.
(3) Joy does not follow Bhiru and Basanti even when they go for long drive.
(4) None of these

30. Pratap Rana will attend the class, only if his father allows him to go by bike.

(1) Pratap Rana is not attending the classes even his father allows him to come by bike.
(2) Pratap Rana's father did not allow him to go by bike but he was attending the class.
(3) Pratap Rana is not attending the classes because his father did not allow him to go on bike.
(4) None of these

PRACTICE EXERCISE 13 (B)

Directions for questions 1 to 4: Each of these questions consists of six statements followed by four sets of three statements each. Select as your answer the set in which the third statement logically follows the first two statements.

1. A. Few afflictions are austerities.
B. Few situations are not austerities.
C. Few adversities are austerities.
D. Few situations are not afflictions
E. All Austerities are situations.
F. Every adversity is an affliction.
(1) DAB (2) DEA
(3) AED (4) CFA

2. A. Passion is hobby.
B. Zeal is passion.
C. Few hobbies are passions.
D. Few hobbies are not zeals.
E. No passion is hobby.
F. Few zeals are not passions.
(1) ABD (2) DFA
(3) AFC (4) BED

3. A. No agitation is ardor.
B. Few ardors are not fervours.
C. No fervour is ardor.
D. Few ardors are agitations.
E. All agitations are fervours.
F. Many fervours are ardors.
(1) EAC (2) EDF
(3) DBE (4) BED

4. A. All acclaims are accolades.
B. No acknowledgement is an acclaim.
C. Few acknowledgements are not accolades.
D. Few accolades are acclaims.
E. Some acknowledgements are not acclaims.
F. No accolade is an acknowledgement.
(1) ABF (2) DFE
(3) CAE (4) DEC

Directions for questions 5 to 8: Each of these questions consists of six statements followed by four sets of three statements each. Select as your answer the set in which the statements are logically related.

5. A. Few straps are not curbs.
B. Some curbs are not chains.
C. All curbs are chains.
D. Many straps are chains.
E. Many chains are curbs.
F. Some straps are not chains.
(1) ACF (2) ABF
(3) DAE (4) AFE

6. A. No dogma is a belief.
B. Few beliefs are dogmatic.
C. Some dogmatics are not dogmas.
D. Few dogmatics are dogmas.
E. Many beliefs are not dogmatic.
F. Some beliefs are dogmas.
(1) ABD (2) ACE
(3) CBA (4) BDF

7. A. Shed is not shelter.
B. Roof is protection.
C. Roof is shed.
D. Roof is shelter.
E. Some shelter is not protection.
F. Shed is protection.
(1) CDA (2) AEF
(3) BCF (4) None of these

8. A. All cricketers are footballers.
B. All footballers are magicians.
C. All magicians are cricketers.
D. Some cricketers are footballers.
E. Some footballers are magicians.
F. Some magicians are cricketers.
(1) ABC (2) EFB
(3) BCD (4) DEF

Directions for questions 9 and 10: These questions are based on the following statements.

Changes are ideas.
No idea is a fancy.
Most fancies are images.

9. Which of the following statement contradicts the conclusion of the above three statements?
(1) Few images are changes
(2) No image is change.
(3) All changes are not images.
(4) All images are changes.

10. If change is an imagination, then which of the following is definitely true?

(1) Few imaginations are images.
(2) Few imaginations are not fancies.
(3) Few images are not imaginations.
(4) Few images are imaginations.

Directions for questions 11 and 12: These questions are based on the following statements.

Drift is gist.
Few twists are drifts.
All gists are thrusts.

11. Which of the following statements contradicts the conclusion of the above three statements?

(1) Few twists are not thrust.
(2) Few thrusts are not twists.
(3) No thrusts are twists
(4) All thrusts are sense.

12. If no gist is light, then which of the following is definitely true?

(1) No light is thrust.
(2) No twist is a light.
(3) Some lights are not thrust.
(4) No drift is a light.

Directions for questions 13 to 15: In each of the following questions, four statements are given. All the statements should considered to be true, even though they vary from the commonly known facts. Exactly three of the statements among the given choices can be true. Find the one that must always be false.

13. All devils are evils. Man is a devil. Few women are not evils. All beings are devils.

(1) All women are men.
(2) Few women are men.
(3) Few women are beings.
(4) No being is women.

14. All teachers are students. No student is a clever. Few clevers are intelligent. All teachers are dull.

(1) Few intelligent are not clevers.
(2) Few clevers are not teachers.
(3) No dull is clever.
(4) No student is dull.

15. All flowers are beautiful. Few flowers are roses. All roses are red. No jasmine is a rose.

(1) Few roses are beautiful.
(2) No flower is red.
(3) Some jasmines are not flowers.
(4) Few red are beautiful.

Directions for questions 16 and 17: Select the correct alternatives from the given choices.

16. The H.R. manager of TCS will come, if the strike does not effect the flight timings. Only if the HR manager of TCS comes, TCS will recruit people.

TCS is recruiting people implies that

(1) the strike effects the flight timings.
(2) the strike does not effect the flight timings.
(3) the HR manager of TCS does not come.
(4) None of these.

17. When the Infosys team's performance is excellent, then Infosys will become the top IT company. Either Infosys does not become the top IT company or TCS remains in the top rank.

The Infosys team's performance is excellent, means that

(1) TCS remains in the top rank.
(2) TCS will not remain in the top rank.
(3) Infosys will be in the top rank.
(4) None of these

Directions for questions 18 to 22: Each question below consists of a main statement followed by four numbered statements. From the numbered statements, select the one that logically follows the main statement.

18. If the teacher is in the class, then the children will either read or keep quiet.

(1) The children will not read or will not keep quiet, implies that the teacher is not in the class.
(2) If the teacher is not in the class, then the children will not read and will not keep quiet.
(3) The children will not read and will not keep quiet, implies that the teacher is not in the class.
(4) If the teacher is not in the class, then the children will not keep quiet or will not read.

19. Whenever an earthquake occurs, either a tsunami or a volcanic eruption takes place.

(1) If a volcanic eruption or a tsunami takes place, then an earthquake must have occurred.
(2) If a volcanic eruption did not occur and a tsunami did not occur, then an earthquake did not occur.
(3) If an earthquake does not occur, neither a tsunami nor a volcanic eruption takes place.
(4) If earthquake occurs and volcanic eruption takes place, then tsunami does not occur.

20. Whenever India plays Pakistan, I will either bite my nails or my BP rises.

(1) India is not playing Pakistan, means that I will neither bite my nails nor my BP does rise.
(2) I am biting my nails or my BP rises, implies that India is playing Pakistan.
(3) I am not biting my nails or my BP did not rise, means that India is not playing Pakistan.
(4) If India is playing Pakistan but my BP is not rising, means that I must be biting my nails.

21. If it is a holiday, then I will draw the curtains and sleep all day.

(1) I did not draw the curtains or I did not sleep all day, means that it was not a holiday.
(2) It is not a holiday, means that I will not draw the curtains and I will not sleep all day.
(3) I did not draw the curtains and I did not sleep all day, means that it was not a holiday.
(4) I have drawn the curtains and I slept all day, means that it was a holiday.

22. Whenever pollution is on the rise, vehicles will be stopped and their emission levels will be checked.

(1) Vehicles are not stopped or their emission levels are not checked, means that the pollution is not on the rise.
(2) If vehicles are not stopped but pollution is on the rise, then the emission levels of vehicles will definitely be checked.
(3) If vehicles are stopped but their emission levels are not checked, it means that the pollution is not on the rise.
(4) Both (1) and (3)

Directions for questions 23 to 27: Each question has a main statement followed by four statements labelled A, B, C and D. Choose the ordered pair of statements where the first statement implies the second, and the two statements are logically consistent with the main statement.

23. Either the wind is strong or the building is weak.

A. The building is weak.
B. The wind is not strong.
C. The building is not weak.
D. The wind is strong.

(1) AD and CB
(2) DC and BA
(3) AB and CD
(4) CD and BA

24. Either the patient dies or is in coma.

A. The patient dies.
B. The patient is in coma.
C. The patient is alive.
D. The patient is not in coma.

(1) BA (2) DA
(3) BC (4) DC

25. Either the Everest is tall or the Pacific is deep.

A. The Everest is tall.
B. The Everest is not tall.
C. The Pacific is deep.
D. The Pacific is not deep.

(1) AC (2) DB
(3) BC (4) AD

26. Either the tank has a leak or the outlet is open.

A. The tank does not have a leak.
B. The outlet is open.
C. The outlet is not open.
D. The tank has a leak.

(1) CA alone
(2) CD alone
(3) DC and BA
(4) CD and AB

27. The ornament is made of gold or silver.

A. The ornament is made of silver.
B. The ornament is not made of gold.
C. The ornament is not made of silver.
D. The ornament is made of gold.

(1) BA (2) DC
(3) CB (4) AD

Directions for questions 28 to 30: Each question given below is a statement followed by four different statements. Choose the one which is the correct negation of the given statement.

28. The presentation was lengthy but simple.

(1) The presentation was not lengthy and not simple.
(2) The presentation was lengthy but not simple.
(3) The presentation was not lengthy or not simple.
(4) The presentation was simple but not lengthy.

29. Unless Tarun learns the basics, he cannot solve connectives.

(1) Tarun learned the basics but he could not solve connectives.

(2) Tarun did not learn the basics, but he could solve connectives.
(3) Tarun learned basics and solved connectives.
(4) Tarun did not learn basics and he did not solve connectives.

30. He either goes to US or he will join in a job.
(1) He went to US and did not join in a job.
(2) He went to US but joined in a job.
(3) He did not go to US and joined in a job.
(4) He did not go to US and did not join in a job.

ANSWER KEYS

PRACTICE EXERCISE 13 (A)

1. All rupees are papers.
2. Some countries are drought prone.
3. (i) Some juices are not mixtures
(ii) All grinders are not juicers
(iii) Some grinders are juicers as well as juicers.

4. 4	**5.** 2	**6.** 2	**7.** 3	**8.** 1	**9.** 2	**10.** 1	**11.** 2	**12.** 3	**13.** 1
14. 4	**15.** 2	**16.** 4	**17.** 3	**18.** 4	**19.** 3	**20.** 2	**21.** 3	**22.** 4	**23.** 4
24. 2	**25.** 1	**26.** 4	**27.** 4	**28.** 2	**29.** 3	**30.** 2			

PRACTICE EXERCISE 13 (B)

1. 4	**2.** 4	**3.** 2	**4.** 3	**5.** 1	**6.** 3	**7.** 3	**8.** 3	**9.** 4	**10.** 2
11. 3	**12.** 4	**13.** 1	**14.** 4	**15.** 2	**16.** 4	**17.** 1	**18.** 3	**19.** 2	**20.** 4
21. 1	**22.** 4	**23.** 4	**24.** 2	**25.** 3	**26.** 4	**27.** 1	**28.** 3	**29.** 2	**30.** 4