9. Syllogism

Introduction

Syllogism means "inference" or "deduction'. We are interested in syllogism more because it appears in many competitive examinations. This is one of the definite questions in all bank recruitment exams. 5 to 10 marks come from this topic in general.

Format of the Questions

A typical question of syllogism as asked in the competitive examination is being provided below.

Directions: In the following type of questions, two statements are being provided followed by two conclusions A and B. You have to study the two statements and then decide whether, from those two statements,

a) Only A follows
b) Only B follows
c) Both A and B follow
d) Either A or B follows
e) Neither A nor B follows.

1. **Statements**: 1) All pins are guns. 2) All guns are bullets.
   Conclusions: A) All pins are bullets. B) Some bullets are pins.
2. **Statements**: 1) All smart are vociferous. 2) No vociferous is introvert.
   Conclusions: A) Some smart are introvert. B) Some vociferous are not smart.

So we should be able to confirm whether the above conclusion can be drawn or not.

*__Possibilities are often asked in the recent exams which are different from definite conclusions.__

When we say "can all bullets be pins" or "all bullets are guns is a possibility" we are talking about a possibility. But if the conclusion is "all bullets are guns" then it should be true in all cases and definite then only conclusion follows.

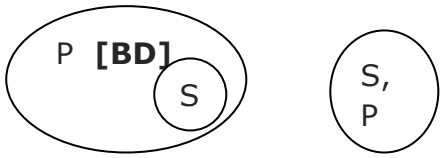
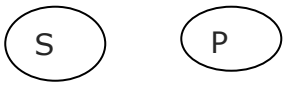
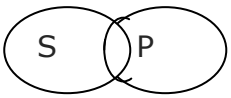
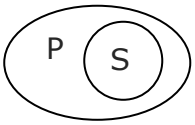
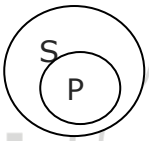
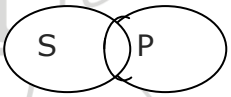
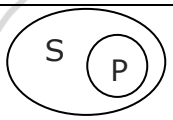
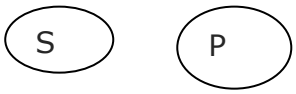
We will discuss about this again at later point of time.

There are mainly two approaches to solve the syllogisms.

There is a very simple approach to solve the syllogisms using Euler's circle.

Given below are the statements which we encounter in recruitment exams. Their notation can be understood from the corresponding diagram.

Tables 2: Euler's Circles and representation of the four propositions

If the Type of the given proposition is	Then its pictorial representation is
A All S are P	Always  BD
E No S are P	Always **[BD]** 
I Some S are P	Either  **[BD]** Some S are P. [Some S are not P]
	Or,  Some S are P [All S are P]
	Or,  Some S are P [All P are S]
O Some S are not P	Either  **[BD]** Some S are not P [Some S are P]
	Or,  Some S are not P [All P are S]
	Or,  Some S are not P [No S are P]

BD: Basic Diagram

When we read the statements first we should draw the basic diagrams keeping in mind the other possible ways of drawing the diagram.

So when the question is related to definite conclusion for all possible diagrams that statement should be true then only it becomes definite conclusion. If it is true for one Diagram and false when we draw it the other way we can consider that only as a possibility not definite conclusion.

Major 4 statements of syllogisms are

A – All pins are gunsE – No pin is gun

I – Some pins are gunsO – Some pins are not guns

Table: Rules of Conversion

A statement of the type	When converted becomes a statement of the type (These are automatically true for the given statements)
A – All pins are guns **E – No pin is gun** **I – Some pins are guns** **O – Some pins are not guns**	**I – Some guns are pins** **E – No gun is pin** **I – Some guns are pins** **O**- type statement cannot be converted

Complimentary pair: (They should be able to cover all the possible cases)

If the given statements are

1. Some cricketers are singers
2. Some singers are actors

Conclusions:

1. Some Cricketers are actors.
2. No cricketer is an actor.

For the above problem if the first statement is wrong then 2nd statements is definitely correct and complimentary.

If 2nd statement is wrong then definitely the first statement will be correct. Complimentary statement for "No cricketer is an actor" is "Some cricketers are actors" not "all cricketers are actors".

Similarly "Some books are not guides" and "All guides are books" are complimentary.

2nd approach to solve the syllogisms (This is mostly useful for clerical exams. Not useful for the questions where 3 or more statements and 3 or more conclusions are present. Also this is not useful for the questions in which possibilities are asked.

Table : To draw conclusions from a pair of aligned statements

If the first statement is of the type	And the second statement is of the type	Then the conclusion will be
A	**A**	**A**
A	**E**	**E**
A	**I**	**-**
A	**O**	**-**
E	**A**	**O***
E	**E**	**-**

E	**I**	**O***
E	**O**	**-**
I	**A**	**I**
I	**E**	**O**
I	**I**	-
I	**O**	-
O	A or E or I or O	-

Note: Short form for the table

A +A= A

A +E= E

E + A= O*

E + I = O*

I+ A= I

I +E= O

So how do we combinethese statements:

Ex. 1.All doors are windows

2. No window is roof

So first statements object has become 2nd statements subject. Then we have to write the resultant as **A + E = E**. Resultant is No statement and starts with first statement's subject and end with 2nd statements object. Ie "no door is roof."

If the 2nd statement is not starting with the object of 1st statements but has the same as object part. Then we should follow the conversion so that we can link them by making it as subject.

Examples Set 1

1. **Statements:** All cats are bats. All bats are tables.
   Conclusions: (i) Some tables are bats.
   (ii) Some tables are cats.
2. **Statements:** Some tables are watches. Some watches are lamps.
   Conclusions: (i) Some tables are lamps.
   (ii) Some tables are not lamps.
3. **Statements**: No tables are watches. Some watches are lamps.
   Conclusions: (i) Some lamps are tables.
   (ii) Some lamps are not table.

Give answer:

A) if only conclusion I follows:

B) if only conclusion II follows;

C) if either I or II follows;

D) if neither I nor II follows; and

E) if both I and II follow.

4. **Statements**: Some rooms are stones. All stones are radios.
   Conclusions: I. Some rooms are radios.
   II. Some stones are rooms.
5. **Statements:** All roads are poles. No pole is a house.
   Conclusions: I. Some roads are houses.
   II. Some houses are poles.
6. **Statements:** All birds are trees. Some trees are hens.
   Conclusions: I. Some birds are hens.
   II. Some hens are trees.
7. **Statements:** All tables are chalks. All chalks are chairs.
   Conclusions: I. All chairs are tables.
   II. All tables are chairs.
8. **Statements:** Some girls are flowers. Some flowers are books.
   Conclusions: I. Some girls are books
   II. No books is a flower.
9. **Statements:** Some hens are cows. All cows are horses.
   Conclusions: I. Some horses are hens.
   II. Some hens are horses.
10. **Statements:** Some dogs are bats. Some bats are cats.
    Conclusions: I. Some dog are cats.
    II. Some cats are dogs.

Answers:

1. Step I: Sentences are already aligned.

Step II: A+ A = A. All cats are tables..

Step III: (a) On converting "All bats are tables" we obtain 'Some tables are bats'.

(b) On converting the conclusions obtained in step II, we get "Some tables are cats". From (a) and (b) we infer that *both conclusions are true*.

Step IV: No need because a definite conclusion has already been obtained.

2. No conclusion is drawn by following step I to step III. Now we see that the conclusions given are in the form of 'some' and 'some not'. Hence we infer that *either I or II follows*.

3. Though the answer choice is in the form of 'some' and 'some nor', we see that E + I = O* gives us "Some lamps are not tables". Hence we obtain a definite conclusion that conclusion II is correct. Hence step IV becomes unnecessary and we choose the answer choice conclusion II following.

4. E: [I + A = I, Some rooms are radios.
Also, Some rooms are stones. Conversion Some stones are rooms.]

5. D: [A + E = E, No roads are houses, But the given conclusions are different.]

6. B: [A + I = No conclusion. But, some trees are hens. Conversion Some hens are trees.]

7. B: [A + A = A, All tables are chairs.]

8. D: [I + I = No conclusion.]

9. E: [I + A = I, Some hens are horses, conversion Some horses are hens]

10. D: [I + I = No Conclusion.]

Examples Set 2(With new pattern questions)

Directions (Q. 1-5): In each question below are given two/three statements followed by two conclusions numbered I and II. You have to take the given statements to be true even if they seem to be at variance with commonly known facts and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

Give answer

1) if only conclusion I follows.
2) of only conclusion II follows.
3) if either conclusion I or conclusion II follows.
4) if neither conclusion I nor conclusion II follows.
5) if both conclusion I and conclusion II follows.

(Q.1-2):

Statements: All gliders are parachutes.
No parachute is airplane.
All airplanes are helicopters.

1. Conclusions:

I. No helicopter is a glider.

II. All parachutes being helicopter is a possibility.

2. Conclusions:

I. NO glider is an airplane.

II. All gliders being helicopters is a possibility.

3. Statements: Some mails are chats. All updates are chats.

Conclusions:

I. All mails being updates is a possibility.

II. No update is a mail.

(Q.4-5):

Statements: No stone is metal.

Some metals are papers.

All papers are glass.

4. Conclusions:

I. No glass is metal.

II. At least some glasses are metals.

5. Conclusions:

I. All stones being glass in possibility

II. No stone is paper.

Directions (Q. 6-11): In each question below are given two/three statements followed by two conclusions numbered I and II. You have to take the given statements to be true even if they seem to be at variance with commonly known facts. Read all the conclusions and then decide which of the given conclusions logically follows from the given statements, disregarding commonly known facts.

Give answer

1) if only conclusion follows.

2) if only conclusion II follows.

3) if either conclusion I or conclusion II follows.

4) if neither conclusion I nor conclusion II follows.

5) if both conclusion I and conclusion II follow.

6. Statements: All rings are circles.
All square are rings.
No ellipse is a circle.
Conclusions: I. Some rings being ellipses is a possibility.
II. At least some circles are squares.

7. Statements: No house is an apartment.
Some bungalows are apartments.
Conclusions: I. No house is a bungalow.
II. All bungalows are houses.

8. Statements: Some gases are liquids.
All liquids are water.
Conclusions: I. All gases being water is a possibility.
II. All such gases which are not water can never be liquids.

9. Statements: All minutes are seconds.
All seconds are hours.
No second is a day.
Conclusions: I. No day is an hour.
II. At least some hours are minutes.

(10-11): Statements: Some teachers are professors.
Some lecturers are teachers.

10. Conclusion: I. All teachers are well as professors being lecturers is a possibility.
II. All those teachers who are lecturers are also professors.

11. Conclusions: I. No professor is a lecturer.
II. All lecturers being professors is a possibility.

Directions (Q.12-18): In each question below are two/three statements followed by two conclusions numbered I and II. You have to take the two/three given statements to be true even if they seem to be at variance with commonly known facts and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

Give answer

1) if only conclusion I follows.
2) if only conclusion II follows.

3) if either conclusion I or conclusion II follows.

4) if neither conclusion I nor conclusion II follows.

5) if both conclusion I and conclusion II follow.

(12-13): Statements: Some institutes are banks. All institutes are academies. All academies are schools.

12. Conclusions: I. Some institutes are not schools.
II. All academies being banks is a possibility.

13. Conclusions: I. All banks can never be schools.
II. All bank which is an institute is a school.

(14-15): Statements: All energies are forces. No force is torque. All torques are powers.

14. Conclusions: I. All energies being power is a possibility.
II. All powers being force is a possibility.

15. Conclusions: I. All those powers if they are forces are also energies.
II. No energy is torque.

16. Statements: All circle are squares. Some squares are rectangles.
Conclusions: I. All rectangles being squares is a possibility.
II. All circles being rectangles is a possibility.

17. Statements: No gadget is a machine. All machines are computers.
Conclusions: I. NO computer is a gadget.
II. All computers being gadgets is a possibility.

18. Statements: Some paintings are drawings. All sketches are paintings.
Conclusions: I. All sketches are drawings.
II. Some sketches being drawings is possibility.

Directions (Q.18-25): In each question below are two/three statements followed by two conclusions numbered I and II. You have to take the given statements to be true even if they seem to be at variance with commonly known facts and then decide which of the given conclusion logically follows from the given statements disregarding commonly known facts.

Give answer

1) if only conclusion I follow.

2) if only conclusion II follows.

3) if either conclusion I or conclusion II follows.

4) if neither conclusion I nor conclusion II follows.

5) if both conclusion I and conclusion II follow.

(18-19): Statements: All buildings are houses.

No house is an apartment.

All apartments are flats.

18. Conclusions: I. No flat is a house.

II. NO building is an apartment.

19. Conclusions: I. All buildings being flats is a possibility.

II. All apartments being building is a possibility.

(20-21): Statements: Some oceans are seas.

All oceans are rivers.

No river is a canal.

20. Conclusions: I. All rivers can never be oceans.

II. All canals being oceans is a possibility.

21. Conclusions: I. No oceans is a canal.

(22-23): Statements: No day is night.

All nights are noon.

No noon is an evening.

22. Conclusions: I. No day is noon.

II. No day is an evening.

23. Conclusions: I. No evenings are nights.

II. All days being noon is a possibility.

(24-25): Statements: Some papers are boards.

No boards are a card.

24. Conclusions: I. No card is a paper.

II. Some papers are cards.

25. Conclusions: I. All cards being papers is a possibility.

II. All boards being papers is a possibility.

KEY:

1.4 2.5 3.1 4.1 5.1

6.2: All squares are rings + All rings are circles = All rings are circles = A+ A= A= All squares are circles → conversion → Some circles are squares. Hence conclusion II (At least some circles are squares', ie Some circles are squares') follows.

We don't need to draw other possibilities. Therefore, the possibility, ie conclusion I follows.

7.4: No house is an apartment + Some apartments are bungalows (conversion of 'Some bungalows are apartments) = E + I =O* = Some bungalows are not houses. There fore neither conclusion I nor conclusion II follows.

8.5: Some gases are liquids + All liquids are water I + A = I = Some gases are water. Now, draw all possible venn diagrams for the above conclusion as given below.

9.1: All seconds are hours (A) →conversion → Some hours are seconds (I) + No second is a day (E) = I + E = O = Some hours are not days. Therefore conclusions I do not follow. All minutes are seconds + All seconds are hours = A + A = A = All minutes are hours → conversion → some hours are minutes (I). Therefore, conclusion II follow.

10.1: From the statements 'Some teachers are professors' there is possibility that 'All teachers are professors' and 'All professors are teachers". Similarly from the statement some lecturers are teachers there is a possibility that All teachers are lecturers. Again all professors are teachers + All teachers lecturer = A + A= A= All professors are lecturers are lectures is a possibility. But conclusion II does not follow.

11.2: From the above conclusion I don't follow. Again, from the above, we have the following possibilities, All lecturers are teachers and All teachers are professors Now, All lecturers are teachers + All teachers are professors = A+ A= A= All lecturers are professors. Therefore conclusion II, ie All lecturers being professors is a possibility follows.

12.2: All institutes are academic + All academics are schools = A + A =A= All institutes are schools. Hence I do not follow. Some institute are banks (I) → conversion → Some banks are institute (I) + All institutes are academics = I + A= I= Some banks are academics. Hence the possibility of II exists.

13.2: Some banks are academics = All academics are schools = I + A = I some banks are schools. This does not lead us to I. II follows. Because All institutes are school.

14.1: No force is torque + All torques are powers = E + A = O * = Some powers are not forces. Hence the possibility of II is ruled out. All energies are forces + No force is torque = A+ E= E= No energy is torque + All torques are powers = E + A = O* = Some powers are not energies. This does no rule out the possibility of I.

15.2: II follows from the solution to the above question. But I do not follow unless we

know that All forces are energies.

16.5: The possibility exists because we don't have any negative statements.

17.4: No gadget is a machine + All machines are computer = E + A = O * = Some computers are not gadget. These rules out the possibility of II. As for I, it may be true but we can't say so with certainly.

18.2: there being no negative statements, the possibility (conclusion II) exists but not certain (conclusion I)

(18-19): All buildings are houses + No house is an apartment = A + E = E = No building is an apartment (i). Again, No house is an apartment + All apartments are flats = E + A = O * = Some flats are not houses (ii). Again, No building is an apartment + All apartments are flats = E + A = O * = Some flats are not buildings (iii)

18.2: Conclusion(i) above is the conclusion II.

19.4: None follows

(20-21): Some oceans are seas (I) → conversion → Some seas are oceans (I) + All oceans are rivers = I + A = I = Some seas are rivers (i). Again, All oceans are rivers + No river is a canal = A + E = E = No ocean is a canal (ii). Again, Some seas are rivers + No river is a canal = I + E = O * = Some canals are not seas (iii).

20.4: All rivers can never be oceans → implication → Some rivers are oceans. This conclusion is the converse of the given premise "All oceans are rivers".

21.5: Conclusions II is the above conclusion (ii). Conclusion I is the above conclusion (i).

(22-23): No day is night + All nights are noon = E + A = O * = Some noon are not days (i). Again, All nights are noon + No noon is an evening = A + E = E = No night is an evening (ii).

22.4: None follow.

23.5: Conclusion I is converse of the above conclusion (ii).

(24-25): Some papers are boards + No board is a card = I + E = O = Some papers are not cards.

24.3: Conclusion I and II form complementary pair. Therefore, either I or II follows.

25.5: None follows.