

19 Syllogisms



The word syllogism means 'conclusion, inference'. Syllogisms are a type of logical argument that uses deductive reasoning to reach a conclusion.

Syllogism is an important topic, and we find question from this topic in various engineering entrance exams. This topic is often asked in GATE. This chapter will explain this concept in detail and also include some practice questions for you can practice. After reading this chapter and solving questions, you do not have to go to any source for practicing this topic.

Two or more statements follow each of the questions in this section, and two or more conclusions follow these statements. It is necessary to determine which of these conclusions logically follows from the given statements. Even if the statements appear to contradict commonly held facts, they must be considered true.

Syllogism questions can be solved in a number of ways. Among all the available methods, a Venn diagram is the most effective and efficient method. It is essential to draw all possible diagrams based on the given statements and then to solve each of these diagrams separately. Finally, the correct answer is the one that is common in all of the diagrams.

Usually, the questions are given in the following way:

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

All pine trees are coniferous.

All coniferous trees are beautiful.

Conclusion:

- A. All pine trees are beautiful.
- B. Some beautiful are pine trees.

Some extra tips and tricks to solve the problems of this chapter

1. Proposition

A proposition is that part that makes up a statement and shows that two things are related in some or the other way. It has three parts: 1: subject; 2: predicate; and 3: relation between subject and predicate.

Examples included are as follows:

- All tigers are big.
- Some boys are handsome.
- The girls of this school are not disciplined.

Subject and predicate

The subject is the part of the proposition about which something is said. A predicate is that part of the proposition which is stated or related to the subject.

For Example: 1. Tigers and boys are all subjects mentioned in above examples, while big, handsome, and disciplined are predicates.

Categorical proposition

A categorical proposition makes a direct assertion. For example, 'All S are P', 'No S is P' and 'Some S are P'. It has no categorical proposition. There are two types of categorical proposition:

- 1. Universal propositions:** These either fully include the subject or fully exclude it.

Examples are as follows:

- a.** All girls are cute.
- b.** No boy is happy.

A proposition 'All boys are bad' is called a universal positive proposition. A proposition in the form of 'No S is P' is called a universal negative proposition.

- 2. Particular propositions:** These either only partly include or only partly exclude

the subject while making a statement.
Examples are as follows:

1. Some rabbits are peacocks.
2. Some circles are not round.

They have clauses such as 'some', 'not many', 'very little', etc.

PRACTICE QUESTIONS

Questions 1-3: Two statements are given followed by two conclusions numbered I and II. You have to consider these statements to be true, even if they seem to vary from commonly known facts. Decide which of the given conclusions logically follows from the given statement.

1. Statements:

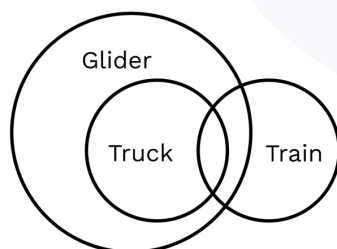
Some trains are trucks.
All trucks are gliders.

Conclusions:

- I. Some trucks are trains.
- II. Some trains are gliders.
- A. If only conclusion I follows.
- B. If only conclusion II follows.
- C. If either conclusion I or conclusion II follows.
- D. If both conclusion I and II follow.

Answer: D

Explanation: According to the diagram, both conclusions I and II follow.



2. Statements:

Some students are toppers.
No topper is a failure.

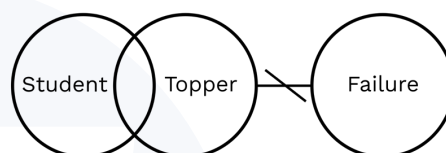
Conclusions:

- I. Some students are failure.
- II. No student is a failure.
- A. Only conclusion I follows.
- B. Only conclusion II follows.

- C. Either conclusion I or conclusion II follows.
- D. Neither conclusion I nor conclusion II follows.

Answer: C

Explanation: Either conclusion I or conclusion II follows.



From the diagram, we can infer that both conclusions I and II have the same elements and are individually wrong.

3. Statements:

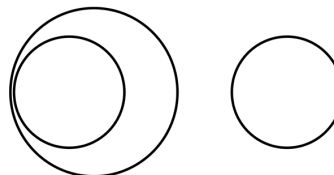
No silver is a ring.
All golds are rings.

Conclusions:

- I. No gold is silver.
- II. Some golds are rings.
- A. Only conclusion I follows.
- B. Only conclusion II follows.
- C. Both conclusions I and II follow.
- D. Neither conclusions I nor conclusion II follows.

Answer: C

Explanation: Both conclusions I and II follow.



From the diagram, we can infer that both conclusions are true. Therefore, option C is correct.

Questions 4-10: Three statements are given, followed by three conclusions numbered I, II and III. You have to consider these statements to be true, even if they seem to vary from commonly known facts. Decide which of the given conclusions logically follows from the given statement.

4. Statements:

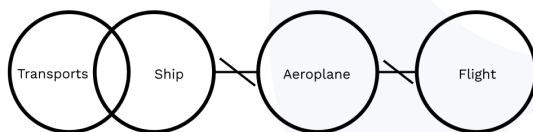
- Few transports are ships.
- No ship is an aeroplane.
- No aeroplanes are flight.

Conclusions:

- I. Some ships are transports.
- II. All transports are ship.
- III. No transports are aeroplane.
- A. Only conclusion I follows.
- B. Only conclusion II follows.
- C. Only conclusion III follows.
- D. None follows.

Answer: A

Explanation: Only conclusion I follows.



From the diagram, we can infer that some transports are ships, which is clearly stated in statement I.

5. Statements:

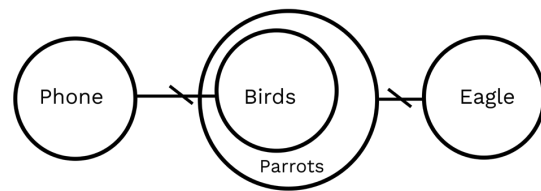
- No phone is a bird.
- All birds are parrots.
- No parrot is an eagle.

Conclusions:

- I. Some phones are birds.
- II. Some birds are parrots.
- III. No bird is a parrot.
- A. Only conclusion I follows.
- B. Only conclusion II follows.
- C. Only conclusion III follows.
- D. Only conclusions I and III follow.

Answer: B

Explanation: Only conclusion II follows.



From the diagram, we can infer that some birds are parrots, which is clearly stated in statement II. If all birds are parrots, then some birds are definitely parrots.

6. Statements:

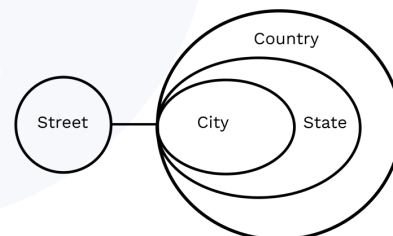
- No street is a city.
- All cities are states.
- All states are countries.

Conclusions:

- I. Some streets are states.
- II. Some cities are countries.
- III. All states are cities.
- A. If only conclusion I follow.
- B. If only conclusion II follows.
- C. If either conclusion II or conclusion III follows.
- D. If both conclusions I and II follow.

Answer: B

Explanation: Only conclusion II follows.



From the diagram, we can infer that all cities are states and all states are countries. Therefore, some cities are countries.

7. Statements:

- All actors are movies.
- Some movies are money.
- No money is rich.

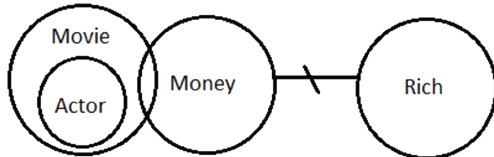
Conclusions:

- I. Some actors are money.
- II. All actors are money.
- III. Some actors are movies.
- A. Only conclusion I follows.
- B. Only conclusion II follows.

- C. Only conclusion III follows.
- D. Only conclusions I and III follow.

Answer: C

Explanation: Only conclusion III follows.



From the diagram, we can infer that some actors are movies, which is clearly stated in statement I.

8. Statements:

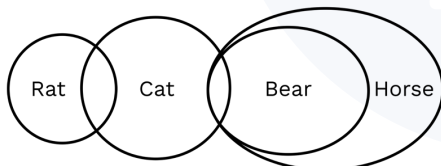
- Some rats are cats.
- Some cats are bears.
- All bears are horses.

Conclusions:

- I. Some rats are horses.
- II. Some horses are cats.
- III. Some rats are bears.
- A. If only conclusion I follows.
- B. If only conclusion II follows.
- C. If either conclusion II or conclusion III follows.
- D. If both conclusions I and II follow.

Answer: B

Explanation: Only conclusion II follows.



From the diagram, we can infer that some cats are bears and all bears are horses. Therefore, some horses are cats.

9. Statements:

- Few flowers are plants.
- Some plants are not green.
- All green are trees.

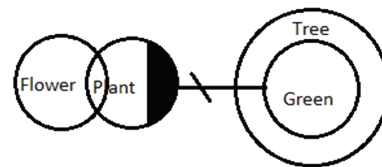
Conclusions:

- I. Some greens are not trees.
- II. Some greens are trees.
- III. No trees are plants.
- A. Only conclusion I follows.
- B. Only conclusion II follows.

- C. Only conclusion III follows.
- D. Either conclusion I or conclusion II follows.

Answer: B

Explanation: Only conclusion II follows.



From the diagram, we can infer that the second conclusion will follow; as, in syllogism, we know that, if in the statement we are given that all P are Q that means some P are Q conclusion will be true, so option B is correct.

10. Statements:

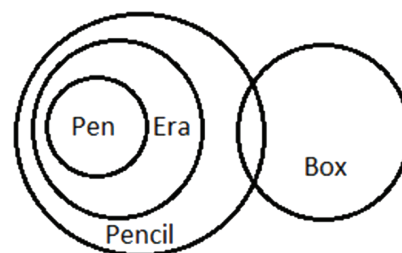
- All pens are erasers.
- All erasers are pencils.
- Some pencils are boxes.

Conclusions:

- I. No erasers are pencils.
- II. All pens are pencils.
- III. No pen is an eraser.
- A. Only conclusion I follows.
- B. Only conclusion II follows.
- C. Only conclusion III follows.
- D. Either conclusion II or conclusion III follows.

Answer: B

Explanation: Only conclusion II follows.



From the diagram, we can infer that all pens are pencils. Therefore, option B is correct.

Questions 11-20: Four statements are followed by four conclusions numbered I, II, III and IV.

You have to consider these statements to be true, even if they seem to vary with commonly known facts. Decide which of the given conclusions logically follows from the given statement.

11. Statements:

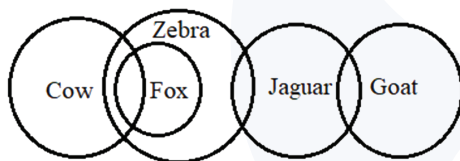
Some cows are foxes.
All foxes are zebras.
Some zebras are jaguars.
Some jaguars are goats.

Conclusions:

- I. Some foxes are jaguars.
 - II. Some foxes are zebras.
 - III. Some cows are zebras.
 - IV. Some jaguars are not goats.
- A. Only conclusion I follows.
B. Only conclusion II follows.
C. Only conclusions II and III follow.
D. Only conclusions III and IV follow.

Answer: C

Explanation: Only conclusions II and III follow.



From the diagram, we can infer that some foxes are zebras and some cows are zebras.

12. Statements:

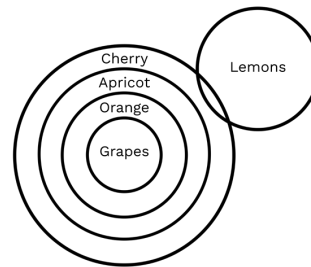
All grapes are oranges.
All oranges are apricots.
All apricots are cherries.
Some cherries are lemons.

Conclusions:

- I. Some grapes are cherries.
 - II. All oranges are cherries.
 - III. Some grapes are lemons.
 - IV. Some lemons are apricots
- A. If only conclusion I follows.
B. If only conclusion II follows.
C. If only conclusion III follows.
D. If both conclusions I and II follow.

Answer: A

Explanation:



According to the diagram, both conclusions I and II follow.

13. Statements:

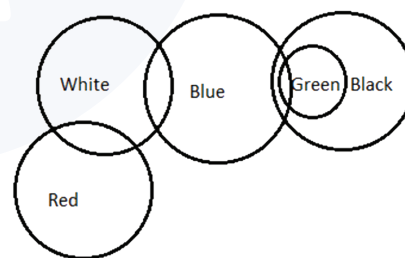
All greens are blacks.
Some greens are blues.
Some blues are whites.
Some whites are reds.

Conclusions:

- I. Some whites are greens.
 - II. Some greens are blacks.
 - III. No blue is black.
 - IV. All greens are blues.
- A. Only conclusion I follows.
B. Only conclusion II follows.
C. Only conclusion III follows.
D. Only conclusion IV follows.

Answer: B

Explanation: Only conclusion II follows.



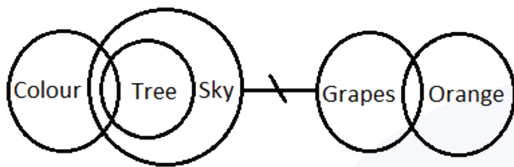
From the diagram, we can infer that some greens are blacks, that is clearly stated in statement I. If all greens are blacks, then some greens are definitely blacks.

14. Statements:

Some oranges are grapes.
Some colours are trees.
All trees are sky.
No sky are grapes.

Conclusions:

- I. Some oranges are sky.
- II. No oranges are trees.
- III. Some grapes are trees.
- IV. No trees are grapes.
 - A. Only conclusion I follows.
 - B. Only conclusion II follows.
 - C. Only conclusion III follows.
 - D. Only conclusion IV follows.

Answer: D**Explanation:** Only conclusion IV follows.

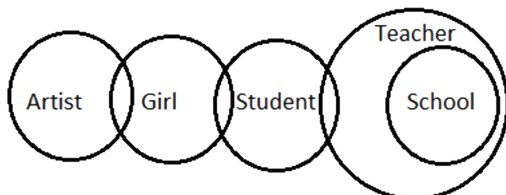
From the diagram, we can infer that no trees are grapes, which is already stated in statement IV.

15. Statements:

- Most artists are girls.
- Few girls are students.
- Some students are teachers.
- All schools are teachers.

Conclusions:

- I. Some schools are teachers.
- II. Few schools are students.
- III. Some students are girls.
- IV. No artists are teachers.
 - A. Only conclusion I follows.
 - B. Only conclusion II follows.
 - C. Only conclusions I and III follow.
 - D. Only conclusions I and IV follow.

Answer: C**Explanation:** Only conclusions I and III follow.

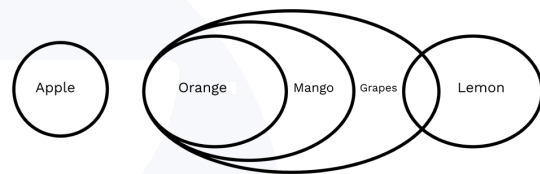
From the diagram, conclusion I and III follows.

16. Statements:

- No apple is an orange.
- All oranges are mangoes.
- All mangoes are grapes.
- Some grapes are lemons.

Conclusions:

- I. All oranges are grapes.
- II. Some apples are mangoes.
- III. Some lemons are mangoes.
- IV. Some apples are lemons.
 - A. If only conclusion I follows.
 - B. If only conclusion II follows.
 - C. If only conclusion III follows.
 - D. If only conclusion IV follows.

Answer: A**Explanation:** Only conclusion I follows.

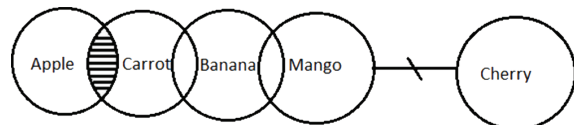
From the diagram, we can infer that all oranges are mangoes and all mangoes are grapes. Therefore, all oranges are grapes.

17. Statements:

- Few apples are carrots.
- Some carrots are bananas.
- Some bananas are mangoes.
- No mango is cherry.

Conclusions:

- I. Some apples are carrots.
- II. Some carrots are mangoes.
- III. Some bananas are not mangoes.
- IV. No apple is banana.
 - A. Only conclusion I follows.
 - B. Only conclusion II follows.
 - C. Only conclusion III follows.
 - D. Only conclusion IV follows.

Answer: A**Explanation:** Only conclusion I follows.

From the diagram, we can infer that only conclusion I will follow.

18. Statements:

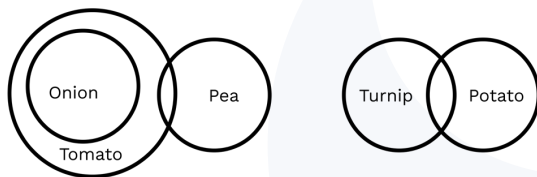
All onions are tomatoes.
Some tomatoes are peas.
No pea is turnip.
Some turnips are potatoes.

Conclusions:

- I. Some onions are peas.
 - II. Some turnips are tomatoes.
 - III. Some potatoes are onions.
 - IV. Some turnips are onions.
- A. If only conclusion I follows.
B. If only conclusion II follows.
C. None of the conclusions follow.
D. If both conclusions I and II follow.

Answer: C

Explanation: None of the conclusion follows.



According to the diagram, none of the conclusions follow.

19. Statements:

Most crabs are shells.
No shell is a mouse.
All mice are fishes.
Few fishes are boards.

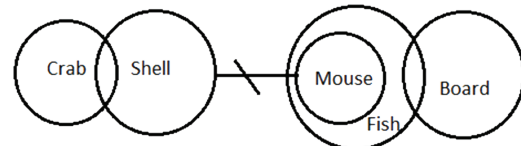
Conclusions:

- I. No shell is a fish.
 - II. Some shells are fishes.
 - III. Some crabs are boards.
 - IV. Some mice are boards.
- A. Only conclusion I follows.
B. Either conclusion I or conclusion III follows.

- C. Either conclusion I or conclusion II follows.
D. Only conclusion IV follows.

Answer: C

Explanation: Either conclusion I or conclusion II follows.



From the diagram, we can infer that in conclusions I and II given elements are similar and individually wrong. Therefore, option C is correct.

20. Statement:

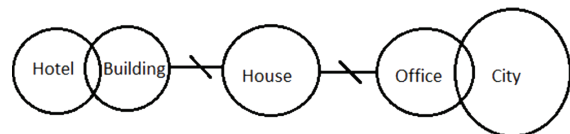
Some hotels are buildings.
No building is a house.
No house is an office.
Some offices are cities.

Conclusions:

- I. No office is a hotel.
 - II. All offices are buildings.
 - III. Some buildings are houses.
 - IV. No office is a house.
- A. Only conclusion I follows.
B. Only conclusion II follows.
C. Only conclusion III follows.
D. Only conclusion IV follows.

Answer: D

Explanation: Only conclusion IV follows.



From the diagram, we can infer that no office is a house, as stated in statement IV. Therefore, option D is correct.

