VENN DIAGRAMS

In this chapter, we deal with questions which aim at analyzing a candidate's ability to relate a certain given group of items and illustrate it diagrammatically. Figures representing groups of items in the form of enclosed regions are called Venn Diagrams named after the British logician John Venn. To represent these diagrams, we use different geometrical figures like circles, triangles, rectangles, etc.

Different Types of Questions Based on Venn Diagrams

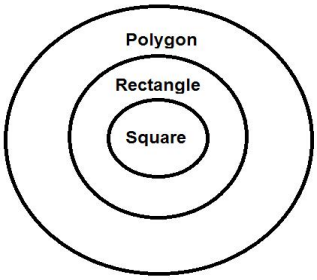
In this chapter, we will deal with basically three entities. There are following five types of questions which are generally asked in various competitions.

Type 1: Universal Affirmative

When one group of items is completely included in the second group of items and the second, again completely belongs to the third group, it is called Universal Affirmative. The Venn Diagram would be as follows:

Example 1: Polygon, Rectangle, Square

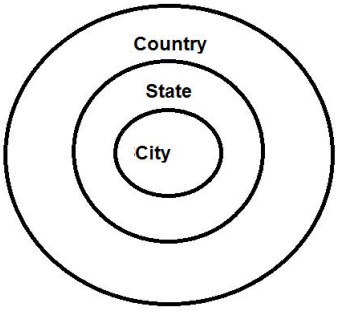
Explanation:



All Squares are Rectangles and all Rectangles are Polygons. Hence, this case comes under Universal Affirmative.

Example 2: Country, City, State

Explanation:



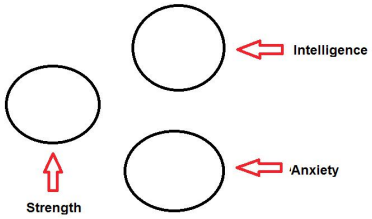
A city is situated within a state and the state is situated within a country.

Type 2: Universal Negative

If the items evidently belong to three different groups, i.e., they are not correlated with each other in any way, called Universal Negative.

Example 3: Intelligence, Anxiety, Strength

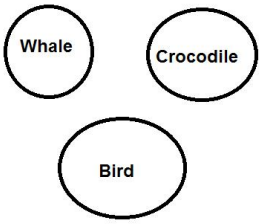
Explanation:



Anxiety, Intelligence and Strength are entirely different from each other.
Because anxiety means- A vague unpleasant emotion that is experienced in anticipation of some (usually ill-defined) misfortune.
Intelligence means- The ability to comprehend; to understand and profit from experience.
Strength means- The property of being physically or mentally strong.

Example 4: Whale, Crocodile, Bird

Explanation:



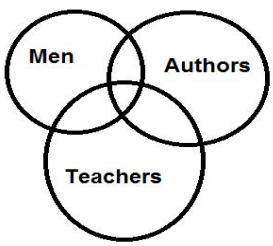
They all belong to different categories.

Type 3: Particular

In this type, two entities are correlated and statements arise like some-first entity belongs to the second entity.

Example 5: Teachers, Authors, men

Explanation:



Here, some Teachers may be Authors and some Teachers may be Men. Also, some Authors may be Men. So, the given items are partly related to each other.

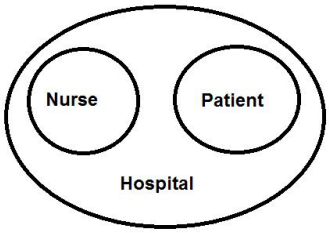
Type 4: Miscellaneous

In this type, we deal with the questions which belong to at least two types as discussed earlier. Different types of cases that can be studied under this type are as follows:

Case 1 - If two separate groups of items are completely unrelated to each other, but they are completely included in the third group, then the relationships can be diagrammatically shown as:

Example 6: Hospital, Nurse, Patient

Explanation:

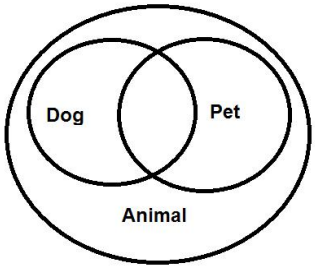


Nurse and Patient are entirely different. But both are parts of Hospital.

Case 2 - When two groups of items have some common relationship and both of them are completely included in the third group, the relationships are shown by two smaller intersecting circles in a third large circle.

Example 7: Animal, Dog, Pet

Explanation:

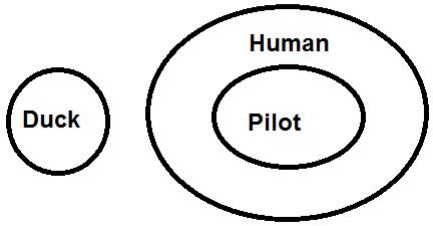


Some Dogs are Pets and some Pets are Dogs but all Dogs and Pets are Animals.

Case 3 - If one item belongs to the class of the second while, the third item is entirely different from the two, then they may be represented by the following diagram.

Example 8: Pilots, Human, Ducks

Explanation:

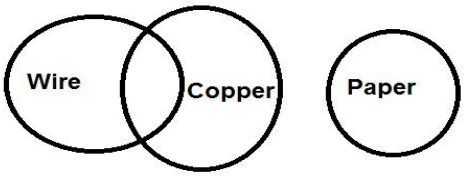


We know all Pilots are Human but Ducks are entirely different to both of these.

Case 4 - If one group of items is partly included in the second group of items and the third group is completely unrelated to these two groups, their relationship is diagrammatically shown as:

Example 9: Wire, Copper, Paper

Explanation:

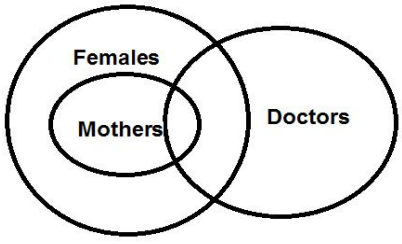


Some Wires are made of Copper but Paper is entirely different.

Case 5 - If one item belongs to the class of second and the third item is partly related to these two, they are represented as shown:

Example 10: Females, Mothers, Doctors

Explanation:

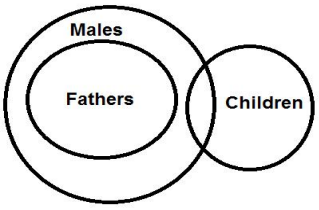


All Mothers are Females but some Females and some Mothers can be Doctors. So, the circles representing Doctors would intersect both of the two concentric circles.

Case 6 - If one item belongs to the class of second and the third item is partly related to the second, they are represented as shown.

Example 11: Males, Fathers, Children

Explanation:

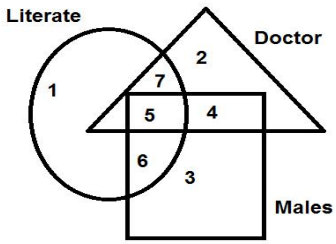


All Fathers are Males. This would be represented by two concentric circles but some Males are Children but Children cannot be Fathers.

Other type Venn Diagrams formed by using Different Geometrical Figures

We have used only circles to represent the different relationship. Here, we will use the different figures to show different relationship.

Example 12: Study the figure given below carefully and answer the questions that follow:



Which part shows Males, who are neither Doctor nor Literate?

A. 1
B. 2
C. 3
D. 4

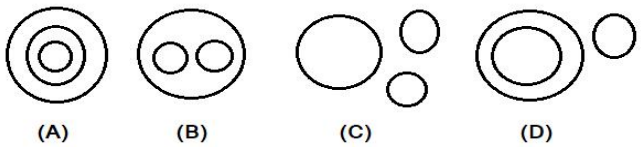
Answer: C

Explanation: Only part 3 showing males, that is 3 is related to males only.

Practice Questions:

Based on Type 1: Universal Affirmative

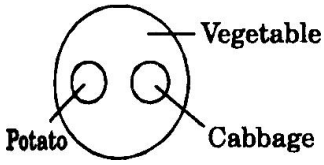
Directions (1-10): **Each of the following questions given below contains three elements. These three elements may or may not have some linkage. Each group of the elements may fit into one of the diagrams at (A), (B), (C) and (D). You have to indicate group of elements in each of the questions fit into which of the diagrams given below. The letter indicating the diagram is the answer.**



1. Vegetables, Potato, Cabbage

Answer: B

Explanation:



Potato and Cabbage are entirely different. But, both are vegetables.

2. Table, Chair, Furniture

Answer: B

Explanation:

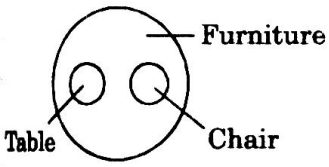
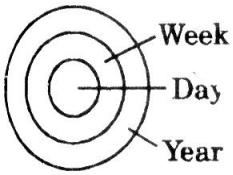


Table and Chair are entirely different but, both are items of furniture.

3. Week, Day, Year

Answer: A

Explanation:

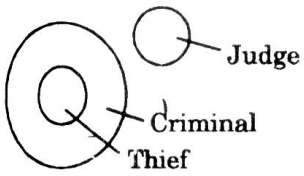


A year consists of weeks, and a week consists of days.

4. Judge, Thief, Criminal

Answer: D

Explanation:

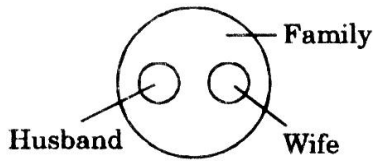


All thieves are criminals. But judge is different.

5. Husband, Wife, Family

Answer: B

Explanation:

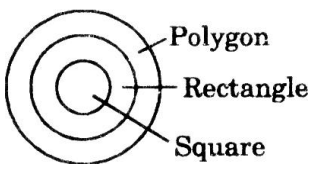


Husband and Wife are entirely different. But, both are parts of a family.

6. Square, Rectangle, Polygon

Answer: A

Explanation:

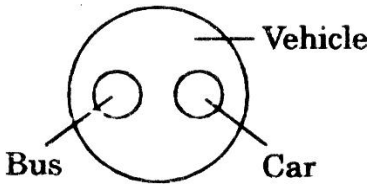


All squares are rectangles. All rectangles are polygons.

7. Bus, Car, Vehicle

Answer: B

Explanation:

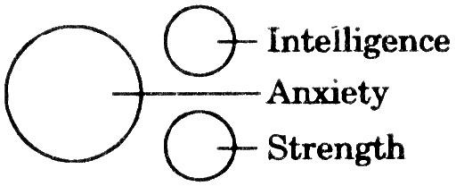


Bus and Car are entirely different. But, both are vehicles.

8. Anxiety, Intelligence, Strength

Answer: C

Explanation:

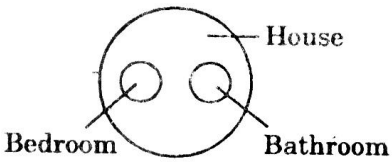


Anxiety, Intelligence and Strength are entirely different from each other.

9. House, Bedroom, Bathroom

Answer: B

Explanation:

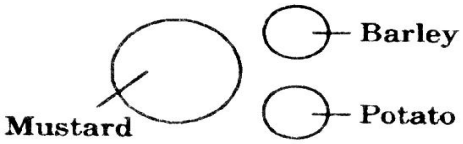


Bedroom and Bathroom are entirely different. But, both are parts of a house.

10. Barley, Potato, Mustard

Answer: C

Explanation:

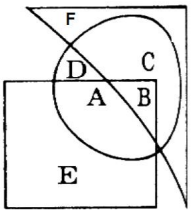


Mustard, Barley and Potato are all separate items, entirely different from each other.

Based on Type II – Universal Negative

Directions (11-15): Study the following figure carefully and answer the questions based on it.

11. Which of the following statements is correct with regard to the given figure?

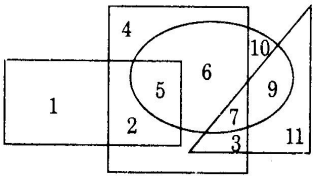


A) A and B are in all the three figures.
B) E, A, B, C are in all the three figures.
C) F, C, D, B, A are in all the three figures.
D) Only B is in all the three figures.

Answer: D

Explanation: B is the region common to the circle, square and triangle.

12. Which number is in the square, ellipse and triangle?

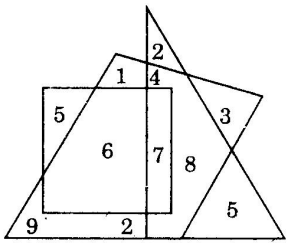


A) 1
B) 5
C) 6
D) 7

Answer: D

Explanation: The number common to the square, ellipse and triangle is 7.

13. Which number is inside all the three figures?

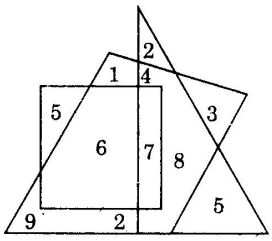


A) 2
B) 6
C) 7
D) 8

Answer: C

Explanation: Clearly, 7 lies inside the square, trapezium and triangle.

14. What is the sum of the numbers which belong to two figures only?

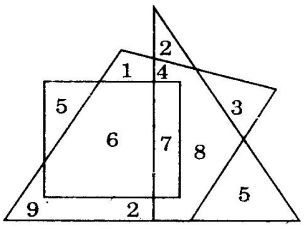


A) 10
B) 14
C) 18
D) None of these

Answer: C

Explanation:
Numbers common to square and trapezium: 6.
Numbers common to trapezium and triangle: 4, 8.
The number common to square and triangle i.e., 7 also lies inside the trapezium. So, it is not to be considered. Required sum = (6 + 4 + 8) = 18.

15. Multiply the number which belongs to the square only with the sum of the numbers which belong to the trapezium only. What is the result?

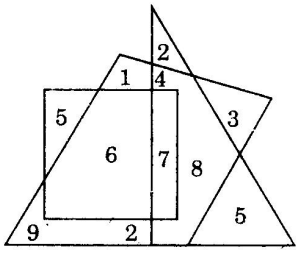


A) 45
B) 60
C) 75
D) None of these

Answer: C

Explanation:
Number which belongs to the square only: 5.
Numbers which belong to the trapezium only: 1, 3, 9, 2.
Required product = 5 x (1 + 3 + 9 + 2) = (5 x 15) = 75.

16. Multiply the number which belongs to all the three figures with the sum of the numbers which belong to the triangle only. What is the result?

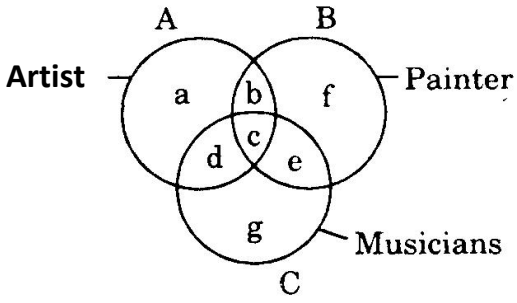


A) 14
B) 35
C) 49
D) None of these

Answer: C

Explanation:
Number which belongs to all the three figures: 7.
Numbers which belong to the triangle only: 2, 5.
Required product = 7 x (2 + 5) = (7 x 7) = 49.

Directions (17-20): **In the figure given below, there are three intersecting (into each representing certain section of people. Different regions are marked a — statements in each of the following questions and choose the letter of the option which correctly represents the statement.**



17. Artist who are painters but not musicians?

A) b
B) c
C) d
D) g

Answer: A

Explanation: The required region is the one which is common to the circles A and B but lies outside circle C i.e., b.

18. Painters who are neither Artist nor musicians?

A) b
B) c
C) f
D) g

Answer: C

Explanation: The required region is the one which lies inside the circle B but is not a part of either circle A or circle C i.e., f.

19. Artist who are musicians but not painters?

A) d
B) c
C) b
D) a

Answer: A

Explanation: The required region is the one which is common to the circles A and C but is not a part of circle B i.e., d.

20. Artist who are painters as well as musicians?

A) a
B) b
C) c
D) d

Answer: C

Explanation: The required region is the one common to all the three circles i.e., c.