

Class – XI

Lesson Plan

TOPIC: SET THEORY

Brief Description: In this chapter, we will teach students about sets, representation of sets, types of sets (like empty set, finite sets, equal sets etc.), subsets, subsets of the set of real numbers especially intervals (with notations), power set, universal set, Venn diagrams, union and intersection of sets difference of sets and complement of a set.

UN Sustainable Goals to be achieved (if any): Quality Education

Objectives: (put Bloom's level)

I - Specific Objectives

Students will be able to understand:

- ❖ Sets
- ❖ Representation of sets
- ❖ Types of sets
 - The Empty set
 - Finite and Infinite Set
 - Equal Set
- ❖ Subsets
- ❖ Power set
- ❖ Universal set
- ❖ Venn diagrams
- ❖ Operations on sets
- ❖ Complement of a set
- ❖ Practical problems on Union and Intersection of sets

II - Behavioral Objectives

Students will observe following behavioral objectives after completion of topics, like:

1. As a 'natural ability of abstraction', students often speak of collection of things as a single entity, "the Detroit Lions", "the Solar system"
2. School bags of children are also related with Set theory. There are usually divisions in the school bags, where the sets of notebooks and textbooks are kept separately
3. Shopping mall is other example of Set theory, as there are separate portions for each kind of things. For instances, clothing shops are on another floor whereas the food court is at another part of the mall.

By understanding the concept and solving variety of problems, students will attain following behavioral objectives:

They will be able to:

1. Use concept of Set theory in Data Structure and Topology (Subject in Computers)
2. Find number of students who've opted for specific sport, club activity
3. Calculate specific number of item (like TV, Car, freeze etc.) sold from total sold items
4. Appreciate different approaches of representation

Process / Activities:

Activity (to introduce the lesson)

For introducing the chapter (Set theory), students will be asked to:

1. Students will be asked to take out things from their bags, arrange and list them

Activity (to support learning)

Students will be asked to conduct an activity in the classroom regarding:

Usage of product A, B and C. They found the following result. It was found that 21 people liked product A, 26 liked product B and 29 liked product C. If 14 people liked products A and B, 12 people liked products C and A, 14 people liked products B and C and 8 liked all the three products. Find how many liked product C only.

Skills (as per subject)

- ❖ Observation
- ❖ Understanding
- ❖ Problem solving

Activity / Assignment (to assess learning)

1. To find the number of subsets of a given set and verify that if a set has n number of elements, then the total number of subsets is 2^n .
2. They were asked to create an example from their surrounding for null set

Exercise for Notebook (put Bloom's level)

- ❖ Glossary
- ❖ R.T.C (Reference to Context)
- ❖ Typology of questions
- ❖ Value based question

Expected Learning Outcomes

Students would be able to learn:

- ❖ Sets
- ❖ Representation of sets
- ❖ Types of sets
 - The Empty set
 - Finite and Infinite Set
 - Equal Set
- ❖ Subsets
- ❖ Power set
- ❖ Universal set
- ❖ Venn diagrams
- ❖ Operations on sets
- ❖ Complement of a set
- ❖ Practical problems on Union and Intersection of sets

Behavioral Perspective:

After completion of chapter student will achieve following perspectives:

1. As a ‘natural ability of abstraction’, students often speak of collection of things as a single entity, “the Detroit Lions”, “the Solar system”
2. School bags of children are also related with Set theory. There are usually divisions in the school bags, where the sets of notebooks and textbooks are kept separately
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Assessment: (put Bloom’s level)

Q1. Given that $N = \{1, 2, 3, \dots, 100\}$, then

- a) Write the subset A of N, whose element are odd numbers (k). (Pre-Structural)
- b) Write the subset B of N, whose element are represented by $x + 2$, where x belongs to N. (Uni-Structural)

Q2. Draw the Venn diagrams to illustrate the following relationship among sets E, M and U, where E is the set of students studying English in a school, M is the set of students studying Mathematics in the same school, U is the set of all students in that school.

(Multi-Structural)

- a) All the students who study Mathematics study English, but some students who study English do not study Mathematics.
- b) There is no student who studies both Mathematics and English.
- c) Some of the student study Mathematics but do not study English, some study English but do not study Mathematics, and some study both.
- d) Not all students study Mathematics, but every student studying English studies Mathematics

Q3. Let U be the set of all boys and girls in a school, G be the set of all girls in the school, B be the set of all boys in the school, and S be the set of all students in the school who take swimming. Some, but not all, students in the school take swimming. Draw a Venn diagram showing one of the possible interrelationships among sets U, G, B and S.

(Relational)