

## ASSIGNMENT COVER PAGE

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| Program:         | BCA                   |
| Subject & Code:  | Mathematics OBCA -113 |
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### NECESSARY INSTRUCTIONS

1. Cover Page must be filled in Capital Letters. All Fields of the Form are compulsory to be filled.
2. The assignment should be written / computer typed on A4 size paper and it should be neat and clearly readable.
3. The cover page should be stapled at the front of each and every assignment.
4. Incomplete Assignments will not be accepted.

=> In a Healthcare system, How can Set Theory be used to categorize patient data for efficient analysis & treatment?

Set Theory → is a branch of mathematics that deals with the properties & relation of sets, which are collections of objects or elements. Set theory can be used to categorize & classify Patient data in a healthcare system for efficient analysis & treatment planning. Here are some examples of how set theory can be applied in healthcare.

Set Operations → Set operations such as union, intersection, difference & complement can be used to combine or compare different groups of patients based on their attributes or outcomes. For example, suppose we have two sets of Patients,

①  $A = \text{(Patients who have diabetes)}$

②  $B = \text{(Patients who have hypertension)}$ .

We can use set operations to find out following information.

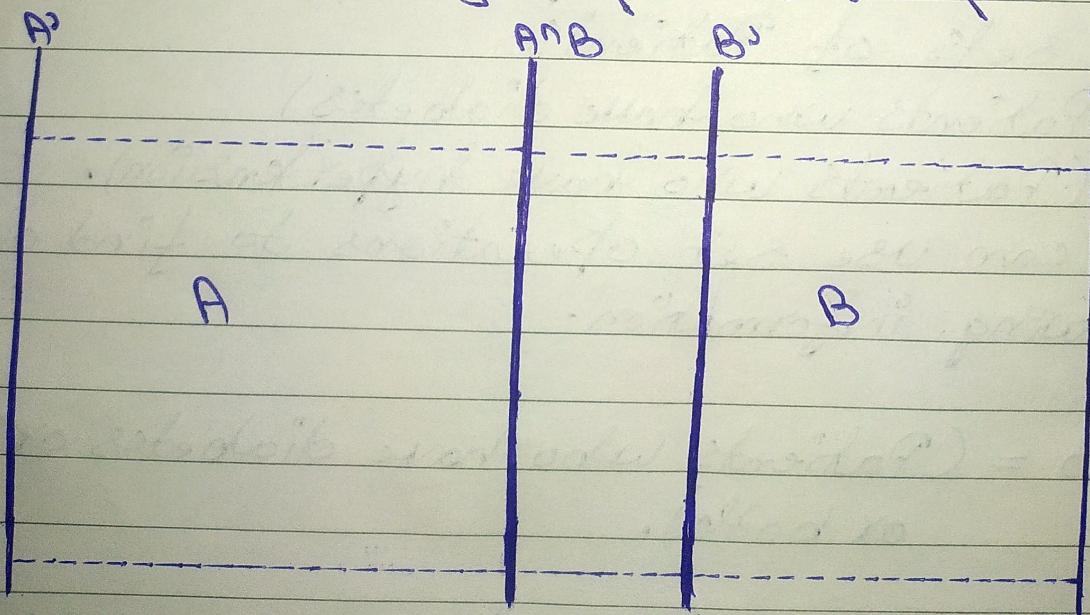
$A \cup B = \text{(Patients who have diabetes or hypertension or both)}$ .

$A \cap B = \text{(Patients who have diabetes & hypertension)}$ .

- $A - B =$  (Patients who have diabetes but not hypertension)
- $B - A =$  (Patients who have hypertension but not diabetes).
- $A^c =$  (Patients who do not have diabetes).
- $B^c =$  (Patients who do not have hypertension).

Venn Diagrams :- Venn diagrams are graphical representations of sets & their relationships. They can be used to visualize the result of set operations & to compare the similarities & differences b/w different groups of patients.

→ for example the following Venn diagram shows the sets A & B from previous example.



- The shaded area represents  $A \cap B$ , which is the set of patients who have both diabetes & hypertension. The unshaded areas represents  $A - B$ ,  $B - A$ ,  $A'$  &  $B'$  which are the sets of patients who have only one disease or neither disease.
- ③ Set cardinality → is the number of elements in a set. It can be used to measure the size or magnitude of different groups of patients.
- For example, suppose we have following information about the sets A & B from the previous example.
- $|A| = 1000$  (there are 1000 patients who have diabetes)
- $|B| = 800$  (there are 800 patients who have hypertension)
- $|A \cap B| = 200$  (there are 200 patients who have both diabetes & hypertension).
- We can set cardinality to calculate following statics.

- $|A \cup B| = |A| + |B| - |A \cap B| = 1000 + 800 - 200 = 1600$  (there are 1600 patients who have diabetes or hypertension or both).
- $|A - B| = |A| - |A \cap B| = 1000 - 200 = 800$  (There are 800 patients who have diabetes only)
- $|B - A| = |B| - |A \cap B| = 800 - 200 = 600$  (There are 600 patients who have hypertension only)
- $|A^c| = |U| - |A'|$  ( $U$  is the universal set of patients) (There are 1000 - 800 patients who do not have diabetes).
- $|B^c| = |U| - |B'|$  (There are 1000 - 600 patients who do not have hypertension).