

# UNIT TEST PAPER

## Sets

1. State whether the following statements are True or False.

- If  $A = \{x \mid x = 5n, 5 < n < 10, n \in \mathbb{N}\}$   
 $n(A) = 4$
- If  $n(A) = n(B)$ , set  $A \leftrightarrow$  set  $B$
- Set  $A = \{x \mid x \in \mathbb{N} \text{ and } x < 3\}$  is a singleton set.
- The number of intelligent students in Class VIII B is a set.
- The number of students passing the half-yearly exams in Class VIII B of a school is a set.
- $A = \{x \mid x = p^3, p < 4, p \in \mathbb{N}\}$  and  $\{x \mid x = m^2, m < 4, m \in \mathbb{N}\}$  are overlapping sets.
- $A = \{x \mid x \in W\}$  is a subset of  $B = \{x \mid x \in Z\}$ .
- $A = \{x \mid x = 2p, p \in \mathbb{N}\}$  and  $B = \{x \mid x = 3p, p \in \mathbb{N}\}$  are disjoint sets.
- If  $\xi = \{p, q, r, s, t, u, v\}$  and  $A = \{q, u, s, t\}$ , then  $A' = \{p, r, v\}$
- If  $A = \{2, 3, 4\}$ , then  $P(A) = \{\{\}, \{2\}, \{3\}, \{4\}, \{2, 3\}, \{2, 4\}, \{3, 4\}\}$

2. If  $C$  is a letter in the word SET, write down all the subsets of  $C$ .

3. Write down the complements of all the 8 subsets of set  $C$  above.

4. If  $Q = \{x \mid x = a^2 + 1, 2 \leq a \leq 5, a \in \mathbb{N}\}$ , what is the power set of  $Q$ ?

5. If  $x = \{x \mid x < 20 \text{ and } x \in \mathbb{N}\}$ ,  
 $A = \{x \mid x = 2a, 3 < a < 8, a \in \mathbb{N}\}$ ,  
 $B = \{x \mid x = 3b, b < 5, b \in \mathbb{N}\}$ , and  
 $C = \{x \mid x = c + 1, 5 < c < 15, c \in \mathbb{N}\}$ ,

find

- $n(B)$
- $n(C)$
- $A'$
- $B'$
- $P(B)$

6. If  $A = \{x \mid x \in \mathbb{N}, 3 < x < 10\}$ ,  
 $B = \{x \mid x = 4a - 1, a < 5, a \in \mathbb{N}\}$ , and  
 $C = \{x \mid x = 3a + 2, a < 7, a \in \mathbb{N}\}$ ,

confirm

- the commutative property of union of sets  $B$  and  $C$
- the commutative property of intersection of sets  $A$  and  $C$
- the associative property of union of sets  $A$ ,  $B$ , and  $C$
- the associative property of intersection of sets  $A$ ,  $B$ , and  $C$

7. If  $A = \{x \mid x \in W, 4 \leq x \leq 12\}$ ,  
 $B = \{x \mid x = a + 1, a < 8, a \in \mathbb{N}\}$ , and  
 $C = \{x \mid x = 2n, 1 < n < 7, n \in \mathbb{N}\}$ , find

- $A - B$
- $B - C$
- $B \cap C$
- $A - (B \cap C)$
- $B - (A \cap C)$
- $A - C$
- $A - (B - C)$
- $A - (B \cup C)$

8. If  $\xi = \{x \mid x \text{ is a letter of the English alphabet between, but not including } d \text{ and } o\}$ ,

$A = \{l, m, n\}$ ,  
 $B = \{e, f, g, h, i, j, k, l\}$ , and  
 $C = \{j, k, l, m\}$ , find

- $A' \cup B'$
- $B' \cap C'$
- $A \cap C$
- $B - (A \cap C)$
- $(B - A)'$
- Is  $(B - C) \subset (B - A)$ ?
- Is  $A' \cap B' = \phi$ ?

9. All 26 customers in a restaurant had either drinks, snacks, or dinner. 18 had snacks, out of which 6 had only snacks, 4 had snacks and drinks but not dinner, 2 had drinks and dinner but not snacks, and 3 had snacks and dinner but not drinks. If 14 customers had drinks, find:

- how many customers had all three—drinks, snacks as well as dinner
- how many customers had dinner but neither snacks nor drinks
- how many customers had only drinks