

Sets — CBSE Pattern Test 2

Class 11 Maths · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 2 — CBSE Pattern (90 minutes, 40 marks)

Class 11 Maths · Sets · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.
 (2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.
 (3) For MCQ questions choose the single correct option; for VSA answers write a single line.
 (4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

1. The set $\{1, 2, 3, \dots\}$ is an example of
 - (A) an infinite set
 - (B) a finite set
 - (C) an empty set
 - (D) a singleton set
2. A set having exactly one element is called a
 - (A) singleton set
 - (B) null set
 - (C) finite set
 - (D) power set
3. If $A \cap B = A$ and $B \cap A = A$, then
 - (A) $A = B$
 - (B) $A \cup B$
 - (C) $B \cup A$
 - (D) $A \cap B = \emptyset$
4. The empty set is a subset of
 - (A) every set
 - (B) no set
 - (C) only the empty set
 - (D) only finite sets
5. $A - B$ contains elements that belong to
 - (A) A but not B
 - (B) B but not A
 - (C) both A and B
 - (D) neither A nor B
6. De Morgan's law states that $(A \cap B)'$ is equal to
 - (A) $A' \cap B'$
 - (B) $A' \cup B'$
 - (C) $A \cap B$
 - (D) $A \cup B$
7. If $A \cap U = \emptyset$, then $A \cup A'$ is equal to
 - (A) U

(B) A

(C)

(D) A'

8. If $n(A) = 12$, $n(B) = 8$ and $n(A \cap B) = 4$, then $n(A * B)$ is

(A) 16

(B) 20

(C) 24

(D) 14

9. Write the set of vowels of the English alphabet in roster form.

10. How many subsets does a set with 3 elements have?

Section B — Short Answer I ($4 \times 2 = 8$ marks)

11. Define a proper subset.

12. Write the power set of $A = \{a, b\}$.

13. If $A = \{1, 2, 3, 4\}$ and $B = \{3, 4, 5\}$, find $A - B$ and $B - A$.

14. Verify De Morgan's law $(A \cap B)' = A' * B'$ for $A = \{1, 2\}$, $B = \{2, 3\}$, $U = \{1, 2, 3, 4\}$.

Section C — Short Answer II ($4 \times 3 = 12$ marks)

15. Explain finite, infinite and empty sets with one example of each.

16. List all the subsets of $A = \{1, 2, 3\}$ and identify the proper subsets.

17. State and explain the commutative and associative laws of set operations with examples.

18. If $n(A) = 20$, $n(B) = 15$ and $n(A * B) = 30$, find $n(A \cap B)$.

Section D — Long Answers ($2 \times 5 = 10$ marks)

19. Write the power set of $A = \{a, b, c\}$ and find how many of its members are proper subsets of A. Prove that if $A \subseteq B$ and $B \subseteq C$, then $A \subseteq C$.

20. Using Venn diagrams, verify $(A * B)' = A' \cap B'$ and $(A \cap B)' = A' * B'$ for sets A and B in a universal set U.

Answer Key (Marking Scheme)

Q1 — (A) an infinite set. Q2 — (A) singleton set. Q3 — (A) $A = B$. Q4 — (A) every set.

Q5 — (A) A but not B. Q6 — (A) $A' * B'$. Q7 — (A) U. Q8 — (A) 16.

Q9 — $\{a, e, i, o, u\}$.

Q10 — 8.

Q11 — B is a proper subset of A if $B \subseteq A$ and $B \neq A$.

Q12 — $\{\emptyset, \{a\}, \{b\}, \{a, b\}\}$.

Q13 — $A - B = \{1, 2\}$; $B - A = \{5\}$.

Q14 — $(A \cap B)' = \{1, 3, 4\} = A' * B'$.

Q15 — Examples as in notes.

Q16 — Subsets: $\{\emptyset, \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\}\}$; proper: exclude $\{1,2,3\}$.

Q17 — Laws as in notes.

Q18 — 5.

Q19 — 8 members, 7 proper subsets; proof as in notes.

Q20 — Venn verification as in notes.