GATE CSE 2027 – Today’s Learning (Day 3)

Date: 04 February 2026 (Wednesday)
Subject: Engineering Mathematics – Discrete Mathematics
Topic: Sets

Concept Summary

A set is a well-defined collection of distinct objects. Important types include empty set, singleton, finite, infinite, universal, subset, and proper subset. Key operations are union, intersection, difference, and complement. De Morgan’s laws and cardinality formulas are heavily tested in GATE.

30 GATE-Level MCQs (With Answers & Explanations)

Q1. If A = {1,2,3}, which is true?

Answer: $1 \in A$
Explanation: 1 is an element of A.

Q2. Which is always true?

Answer: $\varnothing \subseteq A$
Explanation: Empty set is subset of every set.

Q3. If $A \subseteq B$ and $B \subseteq A$, then:

Answer: A = B
Explanation: Mutual containment implies equality.

Q4. If A has n elements, number of subsets?

Answer: 2■
Explanation: Each element has two choices.

Q5. $A \cap \varnothing$ equals:

Answer: $\varnothing$
Explanation: No common elements.

Q6. $A \cup \varnothing$ equals:

Answer: A
Explanation: Union with empty set unchanged.

Q7. $A \cap U$ equals:

Answer: A
Explanation: Universal contains all elements.

Q8. $A \cup U$ equals:

Answer: U
Explanation: Union with universal gives universal.

Q9. $(A')'$ equals:

Answer: A

Explanation: Double complement law.

Q10. $(A \cup B)'$ equals:

Answer: $A' \cap B'$
Explanation: De Morgan's law.

Q11. $(A \cap B)'$ equals:

Answer: $A' \cup B'$
Explanation: De Morgan's law.

Q12. n(A)=20, n(B)=15, $n(A \cap B)=5$. $n(A \cup B)$?

Answer: 30
Explanation: 20+15–5.

Q13. If $A \subset B$, then:

Answer: $A \subseteq B$ and $A \neq B$
Explanation: Proper subset definition.

Q14. Which is NOT subset of A={1,2}?

Answer: {1,2,3}
Explanation: Extra element.

Q15. If $A - B = \varnothing$, then:

Answer: $A \subseteq B$
Explanation: No element outside B.

Q16. n(P(A)) equals:

Answer: $2^{\blacksquare}$
Explanation: Power set size.

Q17. A–A equals:

Answer: $\varnothing$
Explanation: Removing all elements.

Q18. $A \cap A$ equals:

Answer: A
Explanation: Idempotent law.

Q19. $A \cup A$ equals:

Answer: A
Explanation: Idempotent law.

Q20. $A \cup (B \cap C)$ equals:

Answer: $(A \cup B) \cap (A \cup C)$
Explanation: Distributive law.

Q21. If U has 10 elements and A has 4, $n(A')$?

Answer: 6
Explanation: 10–4.

Q22. Complement of A denoted by:

Answer: A′
Explanation: Standard notation.

Q23. If A={}, then A is:

Answer: Empty set
Explanation: Contains no elements.

Q24. Is {∅} empty?

Answer: No
Explanation: Contains one element.

Q25. Proper subsets of n-element set?

Answer: 2■–1
Explanation: Excluding the set itself.

Q26. If A ⊆ B and B ⊆ C:

Answer: A ⊆ C
Explanation: Transitivity.

Q27. Common GATE trap?

Answer: ∈ vs ⊆ confusion
Explanation: Element vs subset.

Q28. If A={1,{2}}, then 2 ∈ A?

Answer: False
Explanation: {2} is element.

Q29. Operation removing common elements?

Answer: Difference
Explanation: A–B removes common.

Q30. Most PYQ-tested topic?

Answer: Cardinality & De Morgan
Explanation: Repeatedly asked.