IMPORTANT MCQs – DIRECT FORMULAS / FACTS

Number of subsets of a set with n elements: $|P(A)| = 2^n$

Probability of impossible event = 0

Probability of sure event = 1

Tree with n vertices $\rightarrow$ Edges = $n - 1$

Sum of degrees of graph = 2E

Zero matrix $\rightarrow$ All elements = 0

Median $\rightarrow$ Middle value after sorting

Linear independence $\rightarrow$ Only trivial solution exists

SET THEORY (VERY IMPORTANT)

Union: $A \cup B$

Intersection: $A \cap B$

Difference: $A - B$

Proper subset: $A \subset B$

Superset: $A \supseteq B$

Power set size: $|P(A)| = 2^n$

GRAPH THEORY (HIGH PROBABILITY)

Degree of vertex: Number of incident edges

Complete graph edges: $n(n-1)/2$

Tree edges: $n - 1$

BFS traversal: Uses Queue, Level-wise traversal

PROBABILITY

P(A) = Favourable / Total

Independent events: $P(A \cap B) = P(A)P(B)$

Conditional probability: $P(A|B) = P(A \cap B)/P(B)$

Bayes' Theorem: $P(A|B) = P(B|A)P(A)/P(B)$

STATISTICS (VERY SCORING)

Mean: $\bar{x} = \Sigma x / n$

Variance: $\sigma^2 = \Sigma(x - \bar{x})^2 / n$

Standard Deviation: $\sigma = \sqrt{\sigma^2}$

MATRICES

Square matrix: Rows = Columns

Identity matrix (2×2): [[1 0][0 1]]

Zero matrix: All entries = 0

Transpose: $(A^\blacksquare)_{ij} = A_{ji}$

RANK OF MATRIX

Convert to row echelon form

Rank = Number of non-zero rows

VECTORS

Linear dependence: One vector is a multiple of another

Eigenvalue equation: $AX = \lambda X$

FINAL 6 TO MEMORIZE (GUARANTEED)

1. BFS (Queue + steps)

2. Power set formula 2^n

3. Variance formula

4. Rank of matrix

5. Linear dependence

6. Bayes' theorem