GATE 2025 Computer Science & IT (CS) – Sample Paper (Original, Exam-Style)

Time: 3 hours

Total marks: 100

Question types: MCQ (negative marking), MSQ (no negative), NAT (no negative)

Total questions: 65 (GA: 10 marks=15; CS core: 55 marks=85)

Marking scheme

- MCQ: +1/−1/3 (for 1-mark), +2/−2/3 (for 2-mark)
- MSQ: +1 or +2; no negative; no partial
- NAT: +1 or +2; no negative

Sections

- General Aptitude (GA): 10 questions, 15 marks
- CS & IT: Programming/Data Structures, Algorithms, TOC, Compiler, COA, OS, DBMS, CN, Digital Logic, Discrete/Engg. Maths (weightage commonly: GA15, Engg Maths13, Core72)

Note: Attempt all questions. For NAT, enter answer with required precision.

General Aptitude (GA) – 10 questions, 15 marks

Q1 (MCQ, 1m) If $3x-2y=7$ and $x+4y=5$, then $x-y$ equals

A. 3 B. 5 C. −3 D. −5

Q2 (MCQ, 1m) Choose the word most opposite in meaning to “abate”.

A. Lessen B. Escalate C. Subside D. Alleviate

Q3 (MCQ, 1m) The average of five consecutive integers is 27. The largest integer is

A. 29 B. 30 C. 31 D. 32

Q4 (MCQ, 1m) A work is done by A in 10 days, by B in 15 days. Together, they take

A. 6 days B. 8 days C. 9 days D. 12 days

Q5 (MCQ, 1m) If “Some birds are mammals” is false, then which is true?

A. No birds are mammals.

B. All birds are mammals.

C. Some birds are not mammals.

D. All mammals are birds.

Q6 (MSQ, 2m) Select all grammatically correct sentences.

P. Each of the players was on time.

Q. Neither the teachers nor the student were absent.

R. The committee have given their decision.

S. Much of the equipment is new.

Options: (multiple correct)

Q7 (MCQ, 2m) A 10% discount followed by 20% discount is equivalent to a single discount of

A. 28% B. 30% C. 32% D. 25%

Q8 (NAT, 2m) If 2^x=5 and 5^y=32, compute x·y (rounded to 2 decimals).

Q9 (MCQ, 2m) A data set has mean 50 and standard deviation 5. After adding 10 to each observation, new mean and SD are

A. 60 and 15 B. 60 and 5 C. 50 and 15 D. 50 and 5

Q10 (NAT, 2m) A train of length 200m crosses a pole in 10s and a 300m platform in T seconds at constant speed. Enter T.

Computer Science & IT – 55 questions, 85 marks

Programming, Data Structures, Algorithms

Q11 (MCQ, 1m) Worst-case time to search an element in an unsorted singly linked list of length n is

A. O(1) B. O(log n) C. O(n) D. O(n log n)

Q12 (MCQ, 1m) A min-heap stores n distinct keys. Number of nodes with degree 2 can be at most

A. $\lfloor (n-1)/2 \rfloor$ B. $\lfloor n/2 \rfloor$ C. $\lceil n/2 \rceil$ D. $n-1$

Q13 (NAT, 1m) In a hash table with chaining, expected successful search cost (comparisons) at load factor α is $1+\alpha/2$. For $\alpha=2$, enter the expected cost.

Q14 (MCQ, 2m) A directed acyclic graph (DAG) with V vertices and E edges: which is true?

A. BFS gives topological order.

B. DFS postorder reversed gives a topological order.

C. A DAG must have at least one Hamiltonian path.

D. A DAG has exactly one topological order.

Q15 (NAT, 2m) Let $T(n)=2T(n/2)+n/\log n$ with $T(1)=1$. The tight asymptotic order of $T(n)$ is $\Theta(n \cdot \log n / \log \log n)$ or $\Theta(n \log n)$ or $\Theta(n)$? Enter 1 for first, 2 for second, 3 for third.

Q16 (MSQ, 2m) For a simple undirected connected graph:

P. A bridge is an edge whose removal increases components.

Q. An articulation point is a vertex whose removal increases components.

R. Every tree edge in DFS is a bridge.

S. Every back edge in DFS forms a cycle with tree edges.

Select all true.

Q17 (MCQ, 2m) For array A[1..n], median of medians selection (group size 5) worst-case time is

A. O(n) B. O(n log n) C. O(n^2) D. O(log n)

Q18 (NAT, 1m) A binary search tree insertion of keys 10,5,1,7,40,50 creates height h (edges) = ?

Q19 (MCQ, 2m) For Knapsack 0/1 with item profits p1..pn and weights w1..wn, DP time complexity (capacity W) is

A. O(nW) B. O(W) C. O(n log W) D. O(n^2)