

PG/Comp. Sc./1st Sem/21(CBCS)

2021

COMPUTER SCIENCE

Paper : COMP 101

[CBCS]

Full Marks : 40

Time : Two Hours

The figures in the margin indicate full marks.

Answer Group - A and any *three* from Group - B

Group - A

1. Answer any *five* questions : 2×5=10

- (a) What are the main building blocks of an algorithm?
- (b) What is the purpose to analyze the complexity of an algorithm?
- (c) What is asymptotic notation?
- (d) Discuss the best case scenario for insertion sort algorithm.
- (e) Compare DFS and BFS.
- (f) What is a spanning tree?
- (g) What is NP-completeness?

Group - B

2. (a) What is Big-Oh? Calculate the Big-Oh for the followings :

- (i) Sequencing
- (ii) If-then-else
- (iii) While loop
- (iv) Recursion

(b) What is the greedy algorithmic technique? Explain with an example.

1+4+2+3

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3. (a) Describe step-by-step process of the Merge Sort technique with an array of numbers. Calculate its time complexity.
(b) Discuss the time complexity of the Quick Sort for Best, Worst & Average case scenarios. 4+2+4
4. (a) Discuss different recurrence relation solving techniques.
(b) Solve the recurrence relation : $T(n) = 2T(n/2) + cn$ and $T(1)=1$. 6+4
5. (a) What is Graph Searching Technique? Describe a graph searching algorithm.
(b) Explain Topological Sort. 1+4+5
6. Write short notes (answer any *two*) : 5×2=10
- (a) Dynamic Programming.
(b) Dijkstra's Algorithm.
(c) Knapsack Algorithm with an example.
(d) Bipartite Graph.
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