Roll No. .....

C

CBC-1953-U

M. C. A. Third Semester

(End Semester)

Examination Dec., 2019

COMPUTER SCIENCE & APPLICATIONS

Paper : CSA-CC-324

(Design and Analysis of Algorithm)

Time : Three Hours] [Maximum Marks : 60

Note :– The question paper is divided into **three** sections. Attempt questions as per direction.

[P. T. O.

SECTION - A

(Objective Type Questions) 1×10=10

Note :– Choose the correct option.

1. (1) In development of dynamic programming the value of an optimal solution is computed in ..... :

   (a) Top down fashion

   (b) Bottom up fashion

   (c) Linear fashion

   (d) None of the above

   (2) Which of the following sorting algorithm does not have a worst case running time of $O(n^2)$:

   (a) Bubble sort

   (b) Insertion sort

   (c) Merge sort

   (d) Quick sort

   (3) Time complexity of radix sort in worst case is :

   (a) $O(nk)$

   (b) $O(n^k)$

   (c) $O(n+k)$

   (d) $O(k^n)$

   (4) Which of the following case does not exist in complexity theory :

   (a) Best case

   (b) Null case

   (c) Worst case

   (d) Average case

   (5) Which sorting algorithm is faster :

   (a) $O(n^2)$

   (b) $O(n \log n)$

   (c) $O(n+k)$

   (d) $O(n^3)$

   (6) Merge sort uses ..... :

   (a) Divide and conquer strategy

   (b) Greedy strategy

(c) Array

(d) Dynamic programming strategy

(7) Which of the following is not dynamic programming problem :

(a) Bellman single source shortest path

(b) Floyd warshall algo problem

(c) 0-1 knapsack problem

(d) Prims minimum spanning tree

(8) Which one of the below is not a divide and conquer approach :

(a) Merge sort

(b) Quick sort

(c) Linear search

(d) Binary search

(9) The data structure used in implementation of BFS is :

(a) Stack

(b) Queue

(c) Linked list

(d) Tree

(10) The breadth first search traversal of a graph will result into :

(a) Linked list

(b) Tree

(c) Graph with back edges

(d) All the above

SECTION - B

(Short Answer Type Questions) 4×5=20

Note :– Attempt any **four** questions. Each question carries **five** marks.

1. Explain BST with example.

2. Compare dynamic programming and greedy algorithm.

3. Explain prim's algorithm with example.

4. Discuss n-queen's problem.

5. Solve the following recurrence relation—

$$T(n)=7T(n/2)+3n^2+2$$

6. Discuss asymptotic notations.

SECTION - C

(Long Answer Type Questions) 3×10=30

Note :– Attempt any **three** questions. Each question carries **ten** marks.

1. What is sorting ? Explain insertion sort with example.
2. What is B-tree ? Construct a B-tree of order 3 by inserting numbers from 1 to 10.
3. Write short notes on the following—
   (a) BFS
   (b) Kruskal's algorithm
   (c) DFS
   (d) Red black tree
4. Explain matrix multiplication problem with example.
5. What is backtracking ? Explain subset-sum problem with example.

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