

**2024/TDC (CBCS)/EVEN/SEM/
CSCHCC-403T/136**

TDC (CBCS) Even Semester Exam., 2024

COMPUTER SCIENCE

(4th Semester)

Course No. : CSCHCC-403T

(Design and Analysis of Computer Algorithms)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

*The figures in the margin indicate full marks
and for the questions.*

UNIT—I

1. Answer any two of the following questions :

2×2=4

- (a) Describe time complexity and space complexity of an algorithm.
- (b) Define Big Oh (O), Big Omega (Ω) and Big Theta (θ).
- (c) Give example of best, worst and average case of sorting problem.

24J/767

(Turn Over)

Answer either Q. No. 2 or 3 :

2. (a) Explain the concept of divide and conquer method.
(b) What are the conditions for travelling salesman problem? $5+5=10$
3. (a) Differentiate between variable length encoding and fixed length encoding. 3
(b) Differentiate between prime algorithm and Kruskal's algorithm. 7

UNIT—II

4. Answer any two of the following questions : $2 \times 2 = 4$
- (a) Which algorithm is used to find the diameter of a tree? Explain how.
(b) Which data structure is best suited for implementing a recursive algorithm? Why?
(c) What are the drawbacks of bucket sort?

Answer either Q. No. 5 or 6 :

5. Explain bubble sort and insertion sort with examples. $5+5=10$
6. What are the various searching techniques? Explain. 10

24J/767

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UNIT—III

7. Answer any two of the following questions :

$2 \times 2 = 4$

- (a) Define the concept of lower bound techniques.
(b) What is the concept of minimum spanning tree?
(c) What do you mean by height balance tree?

Answer either Q. No. 8 or 9 :

8. (a) What are decision trees? Explain with an example. 5
(b) What are some advantages of using decision trees? 2
(c) What type of node is considered PURE? 3
9. (a) What problems do Red-black trees solve? 2
(b) What are the characteristics of Red-black trees? 4
(c) What are the rules to be followed when an item is inserted in a tree? 4

24J/767

(Turn Over)

(4)

UNIT—IV

10. Answer any two of the following questions :

2×2=4

(a) Which of the following is type of amortized analysis?

(i) Aggregate method

(ii) Accounting method

(iii) Potential method

(iv) All of the above

(v) None of the above

Justify your answer.

(b) What is KMP technique used for?

(c) What are real-time applications of string matching?

Answer either Q. No. 11 or 12 :

11. What is the key idea behind amortized algorithm? How is it useful? What are the advantages and disadvantages of amortized analysis? 2+2+3+3=10

12. What is shift in string matching? What is the complexity of string matching? 5+5=10

24J/767

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(5)

UNIT—V

13. Answer any two of the following questions :

2×2=4

(a) In BFS, a node is visited is equal to the number of indegree of the node. Is the statement true or false?

(b) What is the difference between BFS & DFS?

(c) What are the applications of DFS?

Answer either Q. No. 14 or 15 :

14. Solve the minimum spanning tree using Kruskal's algorithm. 10

15. With the help of an example, explain the BFS & DFS traversal of a tree. 10

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24J—190/767