CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

Duration : 02:00 Hours | Max Marks : 50

Instructions :

1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.

Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$T(n) = 2T(n/2) + n\log n$

Unit-2

Q No 2 a) Consider elements {56,28,95,19,79,33,46,57,22}. Make use of a merge sort algorithm for sorting given elements. Show intermediate steps. (5)
Illustrate time complexity analysis of merge sort.

Unit-3

Q No 3 a) Construct an optimal binary search tree for n = 4. (6)
(a1,a2,a3,a4) = (count, float, if, while)
p(1:4) = (1/20, 1/5 , 1/10, 1/20) and
q(0:4)=(1/5, 1/10, 1/5, 1/20, 1/20)
using Dynamic Programming.

Unit-4

Q No 4 a) A team member of a customer satisfaction survey team has to carry out a product survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**600**	**1000**	**1900**	**1100**
600	∞	**1900**	**1900**	**1500**
1000	**1900**	∞	**1700**	**1200**
1900	**1900**	**1700**	∞	**1900**
1100	**1500**	**1200**	**1900**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. Categorize problems in P class, NP class, NP hard & NP complete with example. (15)
2. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)}
3. Develop pseudo code for nondeterministic sorting algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering multiplication operator. [1,2, 3, 4, 5, 6, 7, 8] (10)
2. Explain an evolutionary Algorithm: Tabu Search

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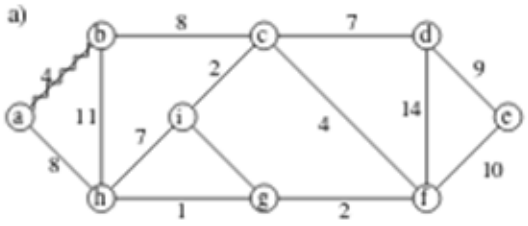
Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = 9T(n/3) + n$$

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing telephone lines along with the cost of installation. Build stepwise plan of cable laying starting from City A, covering all cities along with optimal cost of project. Make use of Prim's greedy algorithm design strategy. (5)

a)



Unit-3

Q No 3 a) Consider the following weighted adjacency matrix and decide the minimum cost tour for Travelling Salesman. Make use of dynamic programming design strategy for planning such a tour. Assume that the starting vertex is 4. (6)

0	**4**	**1**	**3**
4	**0**	**2**	**1**
1	**2**	**0**	**5**
3	**1**	**5**	**0**

Unit-4

Q No 4 a) A News paper agency delivers newspapers to the area assigned in such a manner that the delivery man has to cover all the houses in the assigned area. Plan a tour for him such that he delivers a daily newspaper with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**15**	**22**	**8**	**13**
11	∞	**16**	**9**	**5**
7	**4**	∞	**2**	**9**
15	**8**	**5**	∞	**16**
18	**3**	**6**	**21**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) (15)
1. Develop pseudo code for nondeterministic sorting algorithm
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Prove that given satisfiability problem reduces to clique problem.

Consider $F=(x1 \vee x2 \vee x3) \wedge (\neg x1 \vee \neg x2 \vee \neg x3)$

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering addition operator. [7, 5, -4, 4, 9, 12, 0, 10] (10)

2. Explain an evolutionary Algorithm: Genetic Algorithm

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Unit-2

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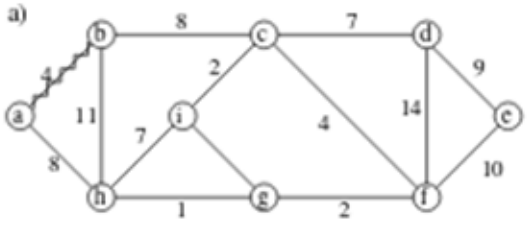

Unit-3

Q No 3 a) Construct an optimal binary search tree for n = 4. (6)
(a1,a2,a3,a4) = (cnum, goto, hop, loop)
p(1:4) = (1, 4, 2, 1) and
q(0:4)=(4, 2, 4, 1, 1) using Dynamic Programming.

Unit-4

Q No 4 a) A Courier agency delivers pamphlets to the area assigned in such a manner that the courier man has to cover all the houses in the assigned area. Plan a tour for him such that he delivers these pamphlets with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**7**	**3**	**12**	**8**
3	∞	**6**	**14**	**9**
5	**8**	∞	**6**	**18**
9	**3**	**5**	∞	**11**
18	**14**	**9**	**8**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
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Unit-5

Q No 5 a) 1. Categorize problems in P class, NP class, NP hard & NP complete with example. (15)
2. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)}
3. Develop pseudo code for nondeterministic sorting algorithm

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Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering multiplication operator. [1, 1, 2, 3, 4, 5, 6, 7] (10)
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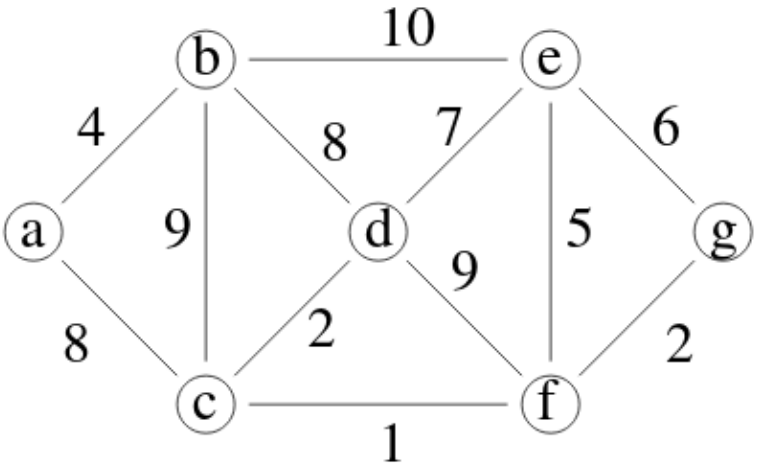
Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = 8T\left(\frac{n}{2}\right) + 1000n^2$$

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing TV Cables with the cost of installation. Build stepwise plan of TV cable laying starting from City A, covering all cities along with optimal cost of project. Make use of Prim's greedy algorithm design strategy. (5)



Unit-3

Q No 3 a) Construct an optimal binary search tree for n = 4. (6)
(a1,a2,a3,a4) = (count, float, if, while)
p(1:4) = (1/20, 1/5 , 1/10, 1/20) and
q(0:4)=(1/5, 1/10, 1/5, 1/20, 1/20)
using Dynamic Programming.

Unit-4

Q No 4 a) A milkman delivers milk cartons to the area assigned in such a manner that he has to deliver milk to all the houses in the assigned area. Plan a tour for him such that he delivers milk daily with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**20**	**30**	**10**	**11**
15	∞	**16**	**4**	**2**
3	**5**	∞	**2**	**4**
19	**6**	**18**	∞	**3**
16	**4**	**7**	**16**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
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Unit-5

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Unit-6

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Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = 9T(n/3) + n$$

Unit-2

Q No 2 a) Apply quick sort on a given sequence (5)
[6, 10, 13, 5, 8, 3, 2, 11].
What is the sequence after the first phase, pivot is the first element.

Unit-3

Q No 3 a) Build the Mathematical Model of 0/1 strategy to select items in Knapsack. (6)
Consider following specification
P = (10,8,15,12,20), W = (2,4,5,3,9),
capacity of knapsack =10, n=5.
Organize items in Knapsack to maximize profit using dynamic programming as algorithm design strategy.

Unit-4

Q No 4 a) A team member of the survey team has to carry out a community health survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**11**	**10**	**9**	**6**
8	∞	**7**	**3**	**4**
8	**4**	∞	**4**	**8**
11	**10**	**5**	∞	**5**
6	**9**	**5**	**5**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
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Unit-5

Q No 5 a) 1. Prove that given satisfiability problem reduces to clique problem. (15)

Consider $F=(x1 \vee x2 \vee x3) \wedge (\neg x1 \vee \neg x2 \vee \neg x3)$

1. Compare problems in P class, NP class, NP hard & NP complete with example.
2. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering multiplication operator. [1, 1, 2, 3, 4, 5, 6, 7] (10)
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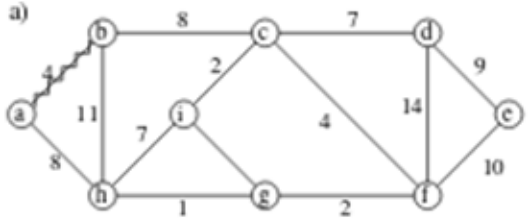
$$T(n) = 9T(n/3) + n$$

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing Electrical power supply distribution cable lines along with the cost of installation. Build stepwise plan of cable lines laying starting from City A, covering all cities along with optimal cost of project. Make use of Kruskal's greedy algorithm design strategy. (5)

a)



Unit-3

Q No 3 a) Consider the following weighted adjacency matrix and decide the minimum cost tour for Travelling Salesman. Make use of dynamic programming design strategy for planning such a tour. Assume that the starting vertex is 4. (6)

0	**4**	**1**	**3**
4	**0**	**2**	**1**
1	**2**	**0**	**5**
3	**1**	**5**	**0**

Unit-4

Q No 4 a) A team member of a customer satisfaction survey team has to carry out a product survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**600**	**1000**	**1900**	**1100**
600	∞	**1900**	**1900**	**1500**
1000	**1900**	∞	**1700**	**1200**
1900	**1900**	**1700**	∞	**1900**
1100	**1500**	**1200**	**1900**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. With a suitable diagram explain the commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. (15)
2. For given function conclude that there exist six numbers of cliques each of size two which satisfies the function. Identify and list all clique pairs.
3. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering multiplication operator. [1,2, 3, 4, 5, 6, 7, 8] (10)

2. Explain an evolutionary Algorithm: Tabu Search

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[6, 10, 13, 5, 8, 3, 2, 11].
What is the sequence after the first phase, pivot is the first element.

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4	**0**	**2**	**1**
1	**2**	**0**	**5**
3	**1**	**5**	**0**

Unit-4

Q No 4 a) A team member of the survey team has to carry out a community health survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**11**	**10**	**9**	**6**
8	∞	**7**	**3**	**4**
8	**4**	∞	**4**	**8**
11	**10**	**5**	∞	**5**
6	**9**	**5**	**5**	∞

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Unit-5

Q No 5 a) 1. Prove that given satisfiability problem reduces to clique problem. (15)

Consider $F=(x1 \vee x2 \vee x3) \wedge (\neg x1 \vee \neg x2 \vee \neg x3)$

1. Compare problems in P class, NP class, NP hard & NP complete with example.
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Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering addition operator. [5, 3, -6, 2, 7, 10, -2, 8] (10)
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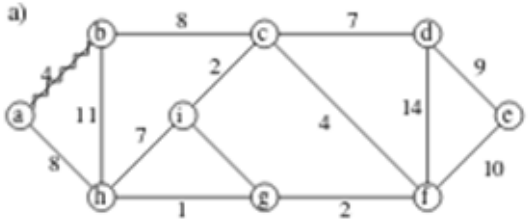

Unit-3

Q No 3 a) Construct an optimal binary search tree for n = 4. (6)
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∞	**15**	**22**	**8**	**13**
11	∞	**16**	**9**	**5**
7	**4**	∞	**2**	**9**
15	**8**	**5**	∞	**16**
18	**3**	**6**	**21**	∞

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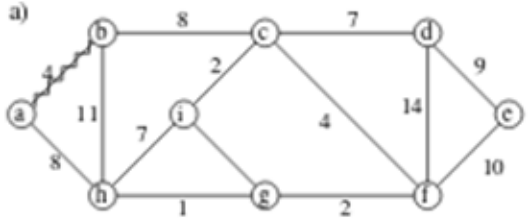

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∞	**600**	**1000**	**1900**	**1100**
600	∞	**1900**	**1900**	**1500**
1000	**1900**	∞	**1700**	**1200**
1900	**1900**	**1700**	∞	**1900**
1100	**1500**	**1200**	**1900**	∞

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Unit-5

Q No 5 a) 1. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)} (15)
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering the subtraction operator. [7, 5, -4, 3, -8, 6, 12, -7] (10)
2. Explain an evolutionary Algorithm: Tabu Search

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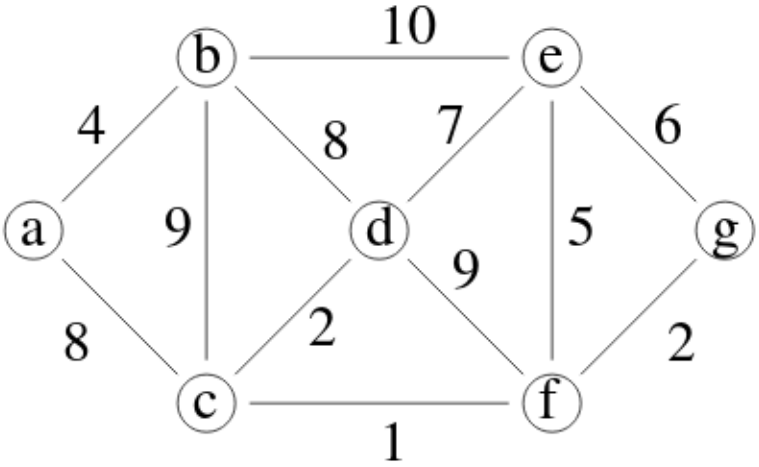

Unit-3

Q No 3 a) Consider the following weighted adjacency matrix and decide the minimum cost tour for Travelling Salesman. Make use of dynamic programming design strategy for planning such a tour. Assume that the starting vertex is 4. (6)

0	**4**	**1**	**3**
4	**0**	**2**	**1**
1	**2**	**0**	**5**
3	**1**	**5**	**0**

Unit-4

Q No 4 a) A News paper agency delivers newspapers to the area assigned in such a manner that the delivery man has to cover all the houses in the assigned area. Plan a tour for him such that he delivers a daily newspaper with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

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11	∞	**16**	**9**	**5**
7	**4**	∞	**2**	**9**
15	**8**	**5**	∞	**16**
18	**3**	**6**	**21**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) (15)
1. Categorize problems in P class, NP class, NP hard & NP complete with example.
2. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)}
3. Develop pseudo code for nondeterministic sorting algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering addition operator. [7, 5, -4, 4, 9, 12, 0, 10] (10)

2. Explain an evolutionary Algorithm: Genetic Algorithm

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

Duration : 02:00 Hours | Max Marks : 50

Instructions :

1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.

Unit-1

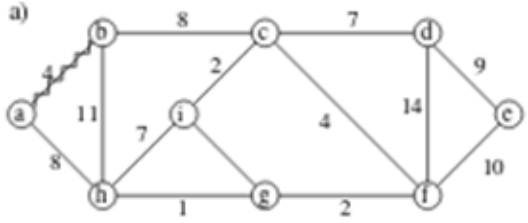
Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

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

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing Electrical power supply distribution cable lines along with the cost of installation. Build stepwise plan of cable lines laying starting from City A, covering all cities along with optimal cost of project. Make use of Kruskal's greedy algorithm design strategy. (5)

a)



Unit-3

Q No 3 a) Construct an optimal binary search tree for n = 4. (6)
(a1,a2,a3,a4) = (cnum, goto, hop, loop)
p(1:4) = (1, 4, 2, 1) and
q(0:4)=(4, 2, 4, 1, 1) using Dynamic Programming.

Unit-4

Q No 4 a) A team member of the survey team has to carry out a community health survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**11**	**10**	**9**	**6**
8	∞	**7**	**3**	**4**
8	**4**	∞	**4**	**8**
11	**10**	**5**	∞	**5**
6	**9**	**5**	**5**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. With a suitable diagram explain the commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. (15)
2. For given function conclude that there exist six numbers of cliques each of size two which satisfies the function. Identify and list all clique pairs.
3. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering multiplication operator. [1,2, 3, 4, 5, 6, 7, 8] (10)
2. Explain an evolutionary Algorithm: Tabu Search

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

Duration : 02:00 Hours | Max Marks : 50

Instructions :

1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.

Unit-1

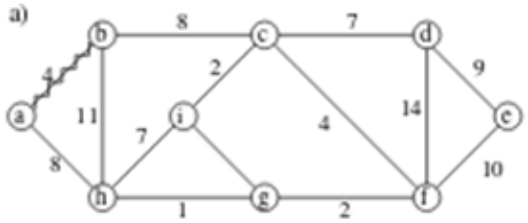
Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = 8T\left(\frac{n}{2}\right) + 1000n^2$$

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing Electrical power supply distribution cable lines along with the cost of installation. Build stepwise plan of cable lines laying starting from City A, covering all cities along with optimal cost of project. Make use of Kruskal's greedy algorithm design strategy. (5)

a)



Unit-3

Q No 3 a) Build the Mathematical Model of 0/1 strategy to select items in Knapsack. (6)

Consider following specification

Items	1	2	3	4	5
weight	1kg	2kg	4kg	2kg	5Kg
profit	5	3	5	3	2

Capacity of bag: 10 kg

Organize items in Knapsack to maximize profit using dynamic programming as algorithm design strategy.

Unit-4

Q No 4 a) A Courier agency delivers pamphlets to the area assigned in such a manner that the courier man has to cover all the houses in the assigned area. Plan a tour for him such that he delivers these pamphlets with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**7**	**3**	**12**	**8**
3	∞	**6**	**14**	**9**
5	**8**	∞	**6**	**18**
9	**3**	**5**	∞	**11**
18	**14**	**9**	**8**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) (15)

1. Categorize problems in P class, NP class, NP hard & NP complete with example.
2. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)}
3. Develop pseudo code for nondeterministic sorting algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering the subtraction operator. [7, 5, -4, 3, -8, 6, 12, -7] (10)

2. Explain an evolutionary Algorithm: Tabu Search

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

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Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

Duration : 02:00 Hours | Max Marks : 50

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Unit-1

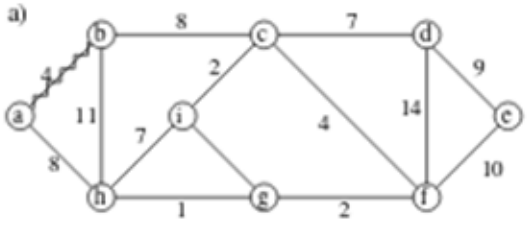
Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

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

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing telephone lines along with the cost of installation. Build stepwise plan of cable laying starting from City A, covering all cities along with optimal cost of project. Make use of Prim's greedy algorithm design strategy. (5)

a)



Unit-3

Q No 3 a) Construct an optimal binary search tree for n = 4. (6)
(a1,a2,a3,a4) = (cnum, goto, hop, loop)
p(1:4) = (1, 4, 2, 1) and
q(0:4)=(4, 2, 4, 1, 1) using Dynamic Programming.

Unit-4

Q No 4 a) A team member of a customer satisfaction survey team has to carry out a product survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**600**	**1000**	**1900**	**1100**
600	∞	**1900**	**1900**	**1500**
1000	**1900**	∞	**1700**	**1200**
1900	**1900**	**1700**	∞	**1900**
1100	**1500**	**1200**	**1900**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. Prove that given satisfiability problem reduces to clique problem. (15)

Consider F=(x1 V x2 V x3) /\ (¬x1 V ¬x2 V ¬x3)

1. Compare problems in P class, NP class, NP hard & NP complete with example.
2. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering addition operator. [5, 3, -6, 2, 7, 10, -2, 8] (10)
2. Explain an evolutionary Algorithm: Genetic Algorithm

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

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Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

Duration : 02:00 Hours | Max Marks : 50

Instructions :

1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.

Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$T(n) = 2T(n/2) + n\log n$

Unit-2

Q No 2 a) Apply quick sort on a given sequence (5)
[6, 10, 13, 5, 8, 3, 2, 11].
What is the sequence after the first phase, pivot is the first element.

Unit-3

Q No 3 a) Consider the following weighted adjacency matrix and decide the minimum cost tour for Travelling Salesman. Make use of dynamic programming design strategy for planning such a tour. Assume that the starting vertex is 4. (6)

0	**4**	**1**	**3**
4	**0**	**2**	**1**
1	**2**	**0**	**5**
3	**1**	**5**	**0**

Unit-4

Q No 4 a) A team member of the survey team has to carry out a community health survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**11**	**10**	**9**	**6**
8	∞	**7**	**3**	**4**
8	**4**	∞	**4**	**8**
11	**10**	**5**	∞	**5**
6	**9**	**5**	**5**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)} (15)
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering addition operator. [7, 5, -4, 4, 9, 12, 0, 10] (10)
2. Explain an evolutionary Algorithm: Genetic Algorithm

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

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Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

Duration : 02:00 Hours | Max Marks : 50

Instructions :

1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.

Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = T(2n/3) + 1$$

Unit-2

Q No 2 a) Apply quick sort on a given sequence (5)
[6, 10, 13, 5, 8, 3, 2, 11].
What is the sequence after the first phase, pivot is the first element.

Unit-3

Q No 3 a) Consider the following weighted adjacency matrix and decide the minimum cost tour for Travelling Salesman. Make use of dynamic programming design strategy for planning such a tour. Assume that the starting vertex is 4. (6)

0	**4**	**1**	**3**
4	**0**	**2**	**1**
1	**2**	**0**	**5**
3	**1**	**5**	**0**

Unit-4

Q No 4 a) A team member of the survey team has to carry out a community health survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**11**	**10**	**9**	**6**
8	∞	**7**	**3**	**4**
8	**4**	∞	**4**	**8**
11	**10**	**5**	∞	**5**
6	**9**	**5**	**5**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. Develop pseudo code for nondeterministic sorting algorithm (15)
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Prove that given satisfiability problem reduces to clique problem.

Consider $F=(x1 \vee x2 \vee x3) \wedge (\neg x1 \vee \neg x2 \vee \neg x3)$

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering multiplication operator. [1, 1, 2, 3, 4, 5, 6, 7] (10)
2. Explain an evolutionary Algorithm: Genetic Algorithm

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

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Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

Duration : 02:00 Hours | Max Marks : 50

Instructions :

1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.

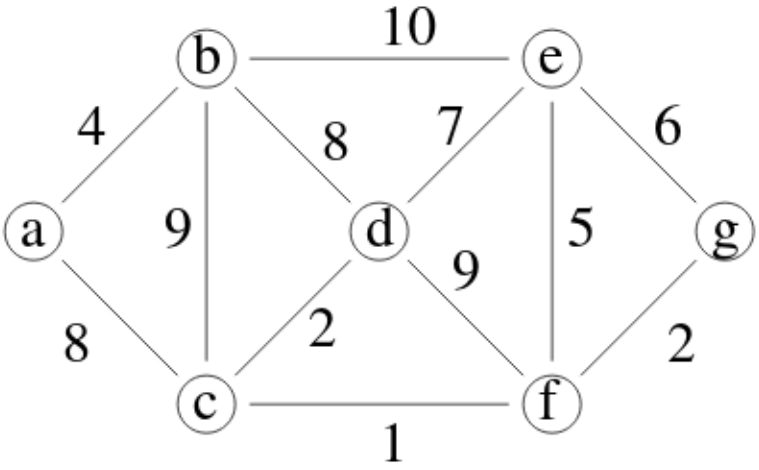
Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = 9T(n/3) + n$$

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing TV Cables with the cost of installation. Build stepwise plan of TV cable laying starting from City A, covering all cities along with optimal cost of project. Make use of Prim's greedy algorithm design strategy. (5)



Unit-3

Q No 3 a) Build the Mathematical Model of 0/1 strategy to select items in Knapsack. (6)

Consider following specification

P = (10,8,15,12,20), W = (2,4,5,3,9),

capacity of knapsack =10, n=5.

Organize items in Knapsack to maximize profit using dynamic programming as algorithm design strategy.

Unit-4

Q No 4 a) A team member of the survey team has to carry out a community health survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**11**	**10**	**9**	**6**
8	∞	**7**	**3**	**4**
8	**4**	∞	**4**	**8**
11	**10**	**5**	∞	**5**
6	**9**	**5**	**5**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)} (15)

2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering multiplication operator. [1,2, 3, 4, 5, 6, 7, 8] (10)

2. Explain an evolutionary Algorithm: Tabu Search

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

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Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

Duration : 02:00 Hours | Max Marks : 50

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1. All questions are compulsory.
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Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = 9T(n/3) + n$$

Unit-2

Q No 2 a) Apply quick sort on a given sequence (5)
[6, 10, 13, 5, 8, 3, 2, 11].
What is the sequence after the first phase, pivot is the first element.

Unit-3

Q No 3 a) Build the Mathematical Model of 0/1 strategy to select items in Knapsack. (6)
Consider following specification

Items	1	2	3	4	5
weight	1kg	2kg	4kg	2kg	5Kg
profit	5	3	5	3	2

Capacity of bag: 10 kg
Organize items in Knapsack to maximize profit using dynamic programming as algorithm design strategy.

Unit-4

Q No 4 a) A milkman delivers milk cartons to the area assigned in such a manner that he has to deliver milk to all the houses in the assigned area. Plan a tour for him such that he delivers milk daily with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**20**	**30**	**10**	**11**
15	∞	**16**	**4**	**2**
3	**5**	∞	**2**	**4**
19	**6**	**18**	∞	**3**
16	**4**	**7**	**16**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)} (15)
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering addition operator. [5, 3, -6, 2, 7, 10, -2, 8] (10)
2. Explain an evolutionary Algorithm: Genetic Algorithm

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

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Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

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Instructions :

1. All questions are compulsory.
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Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

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Unit-2

Q No 2 a) Apply quick sort on a given sequence (5)
[6, 10, 13, 5, 8, 3, 2, 11].
What is the sequence after the first phase, pivot is the first element.

Unit-3

Q No 3 a) Consider the following weighted adjacency matrix and decide the minimum cost tour for Travelling Salesman. Make use of dynamic programming design strategy for planning such a tour. Assume that the starting vertex is 4. (6)

0	**4**	**1**	**3**
4	**0**	**2**	**1**
1	**2**	**0**	**5**
3	**1**	**5**	**0**

Unit-4

Q No 4 a) A team member of a customer satisfaction survey team has to carry out a product survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**600**	**1000**	**1900**	**1100**
600	∞	**1900**	**1900**	**1500**
1000	**1900**	∞	**1700**	**1200**
1900	**1900**	**1700**	∞	**1900**
1100	**1500**	**1200**	**1900**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
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Unit-5

Q No 5 a) 1. Prove that given satisfiability problem reduces to clique problem. (15)

Consider F=(x1 V x2 V x3) /\ (˥x1 V ˥x2 V ˥x3)

1. Compare problems in P class, NP class, NP hard & NP complete with example.
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Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering addition operator. [7, 5, -4, 4, 9, 12, 0, 10] (10)
2. Explain an evolutionary Algorithm: Genetic Algorithm

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

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Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

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Unit-1

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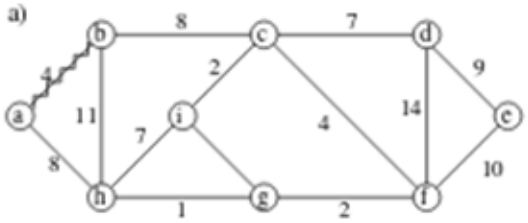
$T(n) = 3T(n/2) + n^2$

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing telephone lines along with the cost of installation. Build stepwise plan of cable laying starting from City A, covering all cities along with optimal cost of project. Make use of Prim's greedy algorithm design strategy. (5)

a)



Unit-3

Q No 3 a) Build the Mathematical Model of 0/1 strategy to select items in Knapsack. (6)

Consider following specification

Items	1	2	3	4	5
weight	1kg	2kg	4kg	2kg	5Kg
profit	5	3	5	3	2

Capacity of bag: 10 kg

Organize items in Knapsack to maximize profit using dynamic programming as algorithm design strategy.

Unit-4

Q No 4 a) A team member of the survey team has to carry out a community health survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**11**	**10**	**9**	**6**
8	∞	**7**	**3**	**4**
8	**4**	∞	**4**	**8**
11	**10**	**5**	∞	**5**
6	**9**	**5**	**5**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
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Unit-5

Q No 5 a) 1. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)} (15)
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering addition operator. [7, 5, -4, 4, 9, 12, 0, 10] (10)
2. Explain an evolutionary Algorithm: Genetic Algorithm

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Third_Year Computer

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Instructions :

1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.

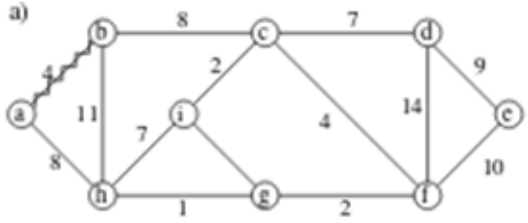
Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

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

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing Electrical power supply distribution cable lines along with the cost of installation. Build stepwise plan of cable lines laying starting from City A, covering all cities along with optimal cost of project. Make use of Kruskal's greedy algorithm design strategy. (5)



Unit-3

Q No 3 a) Build the Mathematical Model of 0/1 strategy to select items in Knapsack. (6)

Consider following specification

P = (10,8,15,12,20), W = (2,4,5,3,9),

capacity of knapsack =10, n=5.

Organize items in Knapsack to maximize profit using dynamic programming as algorithm design strategy.

Unit-4

Q No 4 a) A News paper agency delivers newspapers to the area assigned in such a manner that the delivery man has to cover all the houses in the assigned area. Plan a tour for him such that he delivers a daily newspaper with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**15**	**22**	**8**	**13**
11	∞	**16**	**9**	**5**
7	**4**	∞	**2**	**9**
15	**8**	**5**	∞	**16**
18	**3**	**6**	**21**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) (15)
1. Develop pseudo code for nondeterministic sorting algorithm
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Prove that given satisfiability problem reduces to clique problem.

Consider $F=(x1 \vee x2 \vee x3) \wedge (\neg x1 \vee \neg x2 \vee \neg x3)$

Unit-6

Q No 6 a) (10)
1. Discuss parallel solution for prefix computation problem. Solve considering the subtraction operator. [7, 5, -4, 3, -8, 6, 12, -7]
2. Explain an evolutionary Algorithm: Tabu Search

CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Third_Year Computer

DESIGN AND ANALYSIS OF ALGORITHMS (CE3103)

Duration : 02:00 Hours | Max Marks : 50

Instructions :

1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.

Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = 8T\left(\frac{n}{2}\right) + 1000n^2$$

Unit-2

Q No 2 a) Consider elements {56,28,95,19,79,33,46,57,22}. Make use of a merge sort algorithm for sorting given elements. Show intermediate steps. (5)
Illustrate time complexity analysis of merge sort.

Unit-3

Q No 3 a) Construct an optimal binary search tree for n = 4. (6)
(a1,a2,a3,a4) = (count, float, if, while)
p(1:4) = (1/20, 1/5 , 1/10, 1/20) and
q(0:4)=(1/5, 1/10, 1/5, 1/20, 1/20)
using Dynamic Programming.

Unit-4

Q No 4 a) A Courier agency delivers pamphlets to the area assigned in such a manner that the courier man has to cover all the houses in the assigned area. Plan a tour for him such that he delivers these pamphlets with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**7**	**3**	**12**	**8**
3	∞	**6**	**14**	**9**
5	**8**	∞	**6**	**18**
9	**3**	**5**	∞	**11**
18	**14**	**9**	**8**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. Prove that the given clique decision problem reduces to node cover decision problem. Consider graph G=(V,E)V={1,2,3,4,5} E={(1,2),(1,3),(2,3),(2,5),(3,1),(3,4),(4,3),(5,2)} (15)
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering multiplication operator. [1, 1, 2, 3, 4, 5, 6, 7] (10)
2. Explain an evolutionary Algorithm: Genetic Algorithm

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Unit-1

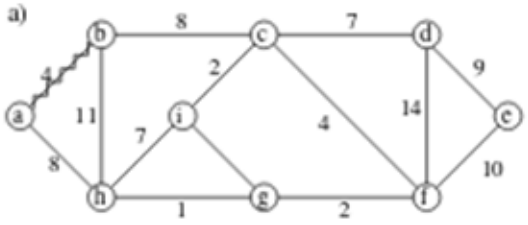
Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

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

Unit-2

Q No 2 a) Figure below shows a weighted undirected graph of cities (Nodes) and edges representing telephone lines along with the cost of installation. Build stepwise plan of cable laying starting from City A, covering all cities along with optimal cost of project. Make use of Prim's greedy algorithm design strategy. (5)

a)



Unit-3

Q No 3 a) Consider the following weighted adjacency matrix and decide the minimum cost tour for Travelling Salesman. Make use of dynamic programming design strategy for planning such a tour. Assume that the starting vertex is 4. (6)

0	**4**	**1**	**3**
4	**0**	**2**	**1**
1	**2**	**0**	**5**
3	**1**	**5**	**0**

Unit-4

Q No 4 a) A Courier agency delivers pamphlets to the area assigned in such a manner that the courier man has to cover all the houses in the assigned area. Plan a tour for him such that he delivers these pamphlets with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**7**	**3**	**12**	**8**
3	∞	**6**	**14**	**9**
5	**8**	∞	**6**	**18**
9	**3**	**5**	∞	**11**
18	**14**	**9**	**8**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. With a suitable diagram explain the commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. (15)
2. For given function conclude that there exist six numbers of cliques each of size two which satisfies the function. Identify and list all clique pairs.
3. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering multiplication operator. [1, 1, 2, 3, 4, 5, 6, 7] (10)

2. Explain an evolutionary Algorithm: Genetic Algorithm

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Instructions :

1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.

Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = 9T(n/3) + n$$

Unit-2

Q No 2 a) Apply quick sort on a given sequence (5)
[6, 10, 13, 5, 8, 3, 2, 11].
What is the sequence after the first phase, pivot is the first element.

Unit-3

Q No 3 a) Build the Mathematical Model of 0/1 strategy to select items in Knapsack. (6)
Consider following specification

Items	1	2	3	4	5
weight	1kg	2kg	4kg	2kg	5Kg
profit	5	3	5	3	2

Capacity of bag: 10 kg
Organize items in Knapsack to maximize profit using dynamic programming as algorithm design strategy.

Unit-4

Q No 4 a) A Courier agency delivers pamphlets to the area assigned in such a manner that the courier man has to cover all the houses in the assigned area. Plan a tour for him such that he delivers these pamphlets with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**7**	**3**	**12**	**8**
3	∞	**6**	**14**	**9**
5	**8**	∞	**6**	**18**
9	**3**	**5**	∞	**11**
18	**14**	**9**	**8**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. Develop pseudo code for nondeterministic sorting algorithm (15)
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Prove that given satisfiability problem reduces to clique problem.

Consider F=(x1 V x2 V x3) /\ (˥x1 V ˥x2 V ˥x3)

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering the subtraction operator. [7, 5, -4, 3, -8, 6, 12, -7] (10)
2. Explain an evolutionary Algorithm: Tabu Search

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Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$$T(n) = 9T(n/3) + n$$

Unit-2

Q No 2 a) Apply quick sort on a given sequence (5)
[6, 10, 13, 5, 8, 3, 2, 11].
What is the sequence after the first phase, pivot is the first element.

Unit-3

Q No 3 a) Construct an optimal binary search tree for n = 4. (6)
(a1,a2,a3,a4) = (cnum, goto, hop, loop)
p(1:4) = (1, 4, 2, 1) and
q(0:4)=(4, 2, 4, 1, 1) using Dynamic Programming.

Unit-4

Q No 4 a) A team member of a customer satisfaction survey team has to carry out a product survey in such a manner that he has to cover all the houses in the allotted area. Plan a tour for him such that he completes this survey in minimum travel cost. The matrix given below indicates cost of to and from travel for each community club location. Apply branch and bound strategy for planning the tour. (9)

∞	**600**	**1000**	**1900**	**1100**
600	∞	**1900**	**1900**	**1500**
1000	**1900**	∞	**1700**	**1200**
1900	**1900**	**1700**	∞	**1900**
1100	**1500**	**1200**	**1900**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) (15)
1. Develop pseudo code for nondeterministic sorting algorithm
2. Compare on the basis of commonly believed relationship among P, NP, NP-Complete, NP-Hard problems. Draw a suitable diagram.
3. Prove that given satisfiability problem reduces to clique problem.

Consider $F=(x1 \vee x2 \vee x3) \wedge (\neg x1 \vee \neg x2 \vee \neg x3)$

Unit-6

Q No 6 a) (10)
1. Discuss parallel solution for prefix computation problem. Solve considering the subtraction operator. [7, 5, -4, 3, -8, 6, 12, -7]
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Unit-1

Q No 1 a) Make use of appropriate method for solving given recurrence relation. Illustrate stepwise solution. (5)

$T(n) = 2T(n/2) + n\log n$

Unit-2

Q No 2 a) Consider elements {56,28,95,19,79,33,46,57,22}. Make use of a merge sort algorithm for sorting given elements. Show intermediate steps. (5)
Illustrate time complexity analysis of merge sort.

Unit-3

Q No 3 a) Build the Mathematical Model of 0/1 strategy to select items in Knapsack. (6)
Consider following specification
P = (10,8,15,12,20), W = (2,4,5,3,9),
capacity of knapsack =10, n=5.
Organize items in Knapsack to maximize profit using dynamic programming as algorithm design strategy.

Unit-4

Q No 4 a) A News paper agency delivers newspapers to the area assigned in such a manner that the delivery man has to cover all the houses in the assigned area. Plan a tour for him such that he delivers a daily newspaper with minimum travel cost. The matrix given below indicates cost of to and from travel for each delivery location. Apply branch and bound strategy for planning the tour. (9)

∞	**15**	**22**	**8**	**13**
11	∞	**16**	**9**	**5**
7	**4**	∞	**2**	**9**
15	**8**	**5**	∞	**16**
18	**3**	**6**	**21**	∞

1. Obtain the reduced cost matrix
2. Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem.
3. Plan a tour and also compute the minimum travel cost.

Unit-5

Q No 5 a) 1. Prove that given satisfiability problem reduces to clique problem. (15)

Consider F=(x1 V x2 V x3) /\ (¬x1 V ¬x2 V ¬x3)

1. Compare problems in P class, NP class, NP hard & NP complete with example.
2. Build pseudo code for nondeterministic searching algorithm

Unit-6

Q No 6 a) 1. Discuss parallel solution for prefix computation problem. Solve considering the subtraction operator. [7, 5, -4, 3, -8, 6, 12, -7] (10)
2. Explain an evolutionary Algorithm: Tabu Search