



[4459] – 269

Seat No.	
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T.E. (Information Technology) (Semester – II) Examination, 2013
DESIGN AND ANALYSIS OF ALGORITHMS
(2008 Pattern)

Time : 3 Hours

Max. Marks : 100

- Instructions :** 1) Answer **three** questions from **each** Section.
2) Answers to the **two** Sections should be written in **separate** answer books.
3) Neat diagrams must be drawn **wherever** necessary.
4) Figures to the **right** indicate **full** marks.
5) **Assume** suitable data if necessary.

SECTION – I

1. A) What is the framework for analysis of algorithms ? Discuss all the components, 8
B) Prove by induction $1 + 2 + 3 + \dots + n = n(n + 1)/2$. 8

OR

2. A) Define and explain O , θ and Ω notations. Give examples. 8
B) Explain direct proof and proof by counter example techniques. 8
3. A) Explain convex hull problem with example. 8
B) What is MST ? Write PRIM's algorithm of MST. Mention its time complexity. 9

OR

4. A) Why Huffman code is called prefix free code ? Construct a Huffman tree for the following data : 9

Character	A	B	C	D	'_'
Probability	0.35	0.1	0.2	0.2	0.15

Find codes of A, B, C, D and '_'.

- B) Write a note on Masters theorem. 8

P.T.O.



5. What is Dynamic programming ? Is this the optimization technique ? Give reasons. What are its drawbacks ? Explain memory functions. 17

OR

6. Explain Warshall's algorithm for computing transitive closure of a directed graph. 17

SECTION – II

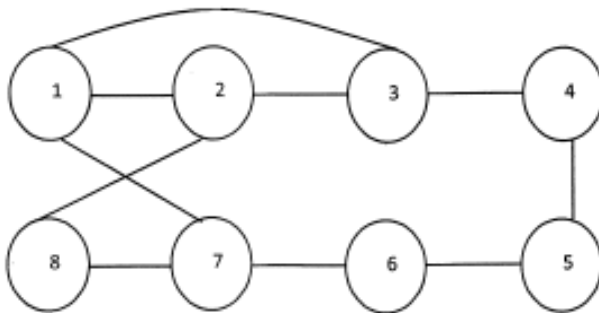
7. A) What is backtracking technique ? Find one solution for 4 - Queen's problem. Show all the steps and explain why you need to backtrack. 8

B) Explain the following terms :

Live nodes, expanding nodes, bounding function and solution space. 8

OR

8. A) Find Hamiltonian Cycle for 8



B) Explain graph coloring problem. 8

9. A) Explain the terms :

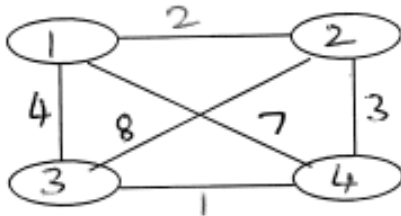
Branch and Bound, LC, LIFO and Bounding function. How are LIFO and LC techniques different ? 9

B) Differentiate between Backtracking and Branch and Bound. 9

OR



10. Explain Branch and Bound strategy. Take an example of Travelling salesman problem using branch and bound. 18



11. Explain the terms decision problem, NP, NP-Hard and NP-Complete. State examples of each. State if P a proper subset of NP or NP is a proper subset of P. Explain with the help of diagram. 16

OR

12. What are the conditions to prove that a problem P is NP-Complete ? Are all NP-Complete problems NP-Hard ? Are all NP-Hard problems NP-Complete ? 16