

Jaya Group of Institutions
4th SEM- B.E

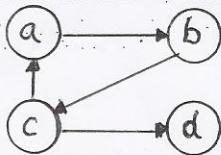
INTERNAL ASSESSMENT -2(MODEL EXAMINATION-2)

Sub Name : Design and Analysis of Algorithm
Sub Code : CS 6402
Duration : 180 Minutes

Date : 4/3/15
Branch : CSE
Max Marks: 100

PART-A(10*2=20) Answer all the Questions

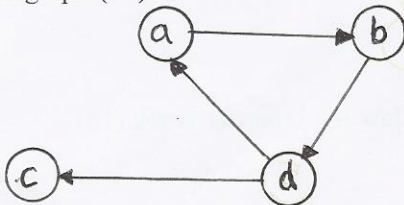
1. What is a principal difference between dynamic programming and divide and conquer techniques?
2. Write pseudo code for computing $C(n,k)$.
3. Find transitive closure of the following graph



4. What is prefix code?
5. What is minimum spanning tree?
6. Does every linear programming problem have an optimal solution?
7. State flow conservation requirement.
8. What is flow augmenting?
9. What is blocking pair?
10. What is bipartite graph?

PART-B(5*16=80) Answer the Questions as per the choice

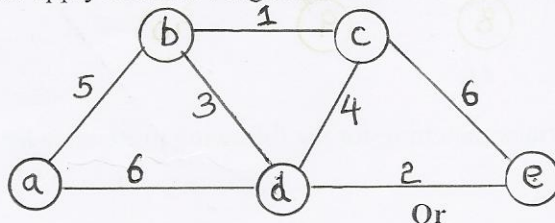
- 11(a) Write algorithm and explain how Warshall's algorithm is used to construct transitive closure for given graph.(16)



Or

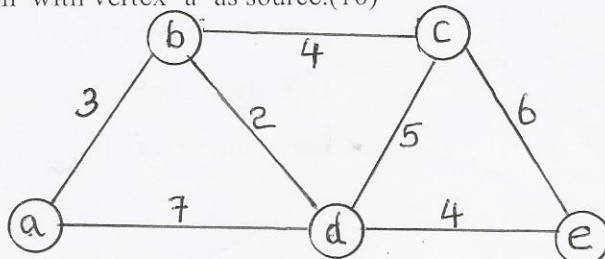
- 11(b) Write a pseudo code to find weight matrix and distance matrix for a digraph by Floyd's algorithm? Explain with example.(16)

- 12(a) Write and apply Kruskal's algorithm to find minimum spanning tree.(16)



Or

- 12(b) Write algorithm for single-source shortest - path problem and solve the following instances of that problem with vertex 'a' as source.(16)



13. (a). Write a dynamic programming algorithm for find an optimal binary search tree.(16)

| Key | A | B | C | D |
|-------------|-----|-----|-----|-----|
| Probability | 0.1 | 0.2 | 0.4 | 0.3 |

Or

13. (b) (i) State and prove maximum flow minimum cut theorem.(8)

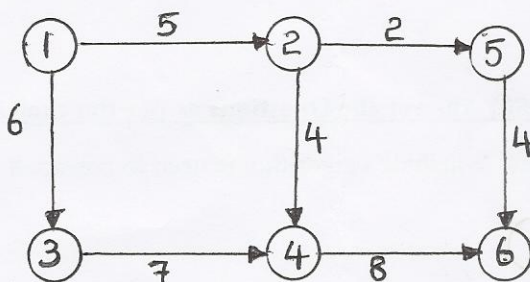
(ii) Prove stable marriage algorithm terminates after no more than n^2 iterations with stable marriage output.(8)

14.(a) Solve the following linear programming geometrically.(16)

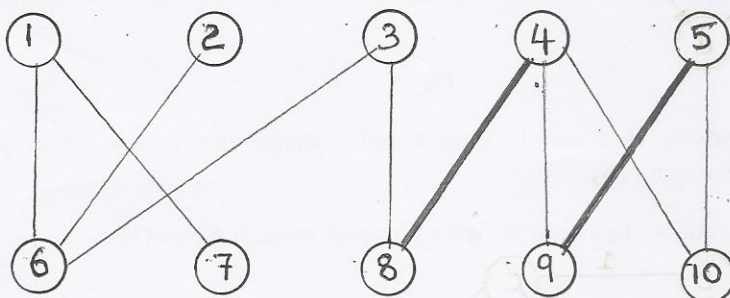
$$\begin{array}{ll} \text{Maximize} & 3x+5y \\ \text{Subject to} & x+y \leq 4 \\ & x+3y \leq 6; \quad x \geq 0, y \geq 0 \end{array}$$

Or

14.(b) Write and apply shortest augmenting-path algorithm to find maximum flow and minimum cut in the following network.(16)



15.(a) Write and apply the maximum-matching algorithm to the following bipartite graph.(16)



Or

15.(b) Write algorithm and find a stable marriage matching for the following preference list of both men and women.(16)

Men's preferences

| | 1 | 2 | 3 |
|-------|-----|-----|-----|
| Bob : | Lea | Ann | Sue |
| Jim : | Lea | Sue | Ann |
| Tom : | Sue | Lea | Ann |

Women's preferences

| | 1 | 2 | 3 |
|-------|-----|-----|-----|
| Ann : | Jim | Tom | Bob |
| Lea : | Tom | Bob | Jim |
| Sue : | Jim | Tom | Bob |