PG – 503

IV Semester M.C.A. Examination, June 2016
(CBCS)
COMPUTER SCIENCE
MCA 402 T : Advanced Algorithms

Time : 3 Hours | Max. Marks : 70

PART – A

Answer **any five** of the following. **Each** question carries **six** marks. **(5x6=30)**

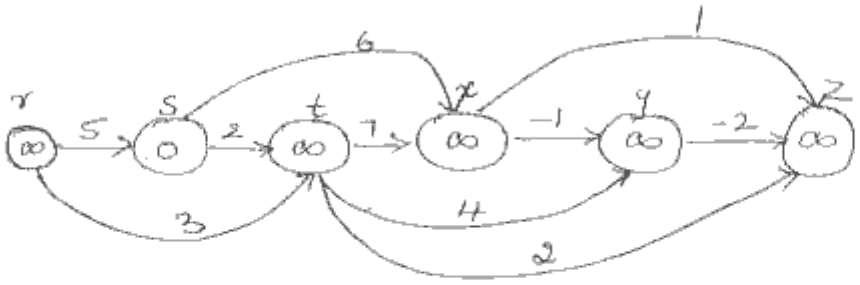
1. Explain different types of Asymptotic Notations.

2. Using the Master Method, solve the following recurrences :

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

   b) $T(n) = 3T\left(\frac{n}{4}\right) + n \log n$.

3. Write an algorithm for single-source shortest path in DAG. Also apply the algorithm for the following graph by taking source vertex as 'S'.



4. Explain Max-Flow Min-Cut theorem an algorithm.

5. Consider an RSA key set with p = 11, q = 29, n = 319 and e = 3. What value of d should be used in the secret key ? What is the encryption of the message M = 100 ?

P.T.O.

6. Working modulo q = 11, how many spurious hits does the Rabin-Karp matcher encounter in the text T = 3141592653589793 when looking for the pattern P = 26.

7. Solve the following instance of the subset sum problem for

   S = {3, 34, 4, 12, 5, 2} and sum = 9.

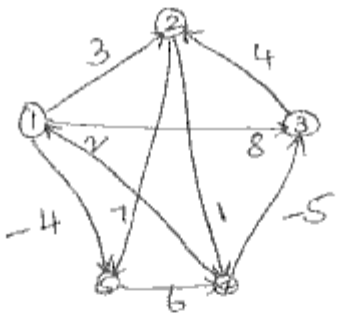
8. List and discuss three major constraints to be taken care of while designing a parallel algorithm.

PART – B

Answer **any four** of the following questions. **Each** carries **10** marks : **(10x4=40)**

9. Explain aggregate analysis with stack operations and incrementing a binary counter.

10. Compute all-pairs shortest paths for the following directed graph using Johnson's algorithm.



11. Give the pseudocode for computing extended Euclid. Find gcd (99, 78) using extended Euclid's algorithm and show the computation steps at each level of recursion.

12. Explain Boyer Moore Algorithm for string Matching and trace the algorithm for the following text and pattern :

    T : GTTATAGCTGATCGCGGCGTAGCGGCGAA

    P : GTAGCGGCG

13. Explain Approximation vertex cover algorithm with neat diagram. Explain its operation through psuedocode.

14. Write short notes on :

    a) String Matching with Finite Automata.

    b) Travelling salesman problem (TSP).