

ECSE701L (Advanced Data Structures and Algorithms)

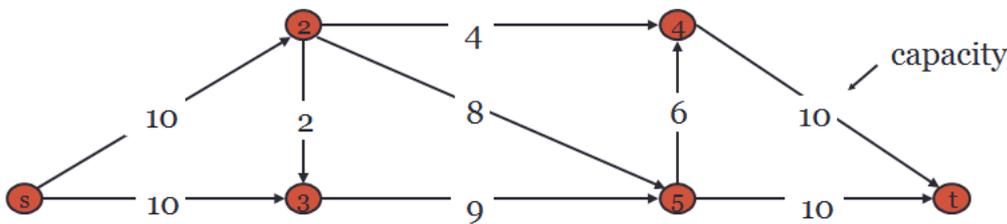
Time allowed: 2 Hr

Max. Marks: 40

Note: All questions carry equal weightage of five marks. Attempt questions in order given.

Q1. A) Online Algorithms are used to take care of the real time nature of the transactions and tasks. Problem of K-Servers is popularly used to understand the key concepts of online algorithms. Take an example of K-Server Problem and solve it using online algorithm concept. Give an algorithm with proper documentation for Online K-Server problem. 5

b) Write the Ford-Fulkerson Algorithm and solve the following example with the help of the algorithm. 5



Q2. Write Briefly about the following. It should include proper example to demonstrate the concept.

- a) Random Walk
- b) Cut-Set
- c) Distribution Sort
- d) Isomorphism
- e) Dynamic Programming

5\*2

Q3. Write the Pseudo-code to solve the following problems

2\*5

- a) Quick Sort Problem using Randomized Algorithm
- b) Subset problem using Genetic Algorithm

Don't write the usual algorithms for Quick Sort and Subset problem. Algorithm should specifically use the techniques written in the question. Also include suitable comments as per the standards to make your algorithm properly readable.

Q4. A) Discuss Partial and Full retroactivity in retroactive data structures

2.5

B) Enumerate all the steps used in the decrease key operation of Fibonacci Heap data structure with the help of suitable example. 2.5

C) Justify the statement with regard to KMP. "Observation that when a mismatch occurs, the word itself embodies sufficient information to determine where the next match could begin, thus bypassing re-examination of previously matched characters" and give enough arguments to support your case. 2.5

D) "2-SAT is easy while 3-SAT is difficult". It captures the essence of classification problem in Computer Science Research. Discuss various issues related with the statement. 2.5