C 6251 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2005

CS. 2K. 601—DESIGN AND ANALYSIS OF ALGORITHMS

(New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

I. (a) Prove that for any two functions $f(n)$ and $g(n)$, $f(n) = \theta(g(n))$ if and only if $f(n) = \theta(g(n))$ and $f(n) = \Omega(g(n))$.

(b) Write a procedure to insert a node with value "key" into a heap A. Assume appropriate data structure for the heap A.

(c) Write short notes on optimal polygon triangulation problem.

(d) Explain Kniskals algorithm which is based directly on the generic minimum-spanning tree algorithm.

(e) Write short notes on Vetex-cover problem.

(f) Show that the travelling-salesman problem is NP-complete.

(g) Write Pollard rho factoring algorithm to find the factor of n.

(h) What is meant by universal hashing ? How this approach is able to yield good performance ?

(8 × 5 = 40 marks)

Part B

II. (a) Discuss in detail about the *three* different methods available for solving recurrences.

Or

(b) Analyse the behaviour of Quick sort algorithm for Worst cases and Average cases.

III. (a) Describe in detail about Flayol-Warshll algorithm that is used to solve all pair shortest path problem on a directed graph G = (V, E).

Or

(b) Develop an algorithm to solve Matrix-chain multiplication problem using dynamic programming approach.

IV. (a) State Hamiltonian cycle problem and explain how this problem belongs to NP-complete class.

Or

(b) State subset sum problem and derive a fully polynomial-time approximation scheme by trimming each list Li after its creation.

Turn over

V. (a) (i) Write an algorithm to perform probabilistic primality test on the given integer n suggested by Miller-Rabin also called as strong Pseudoprime test. (10 marks)

(ii) State and explain Monte Coglo algorithm. (5 marks)

Or

(b) (i) Discuss in detail about the randomized solution available for eight-queen problem. (10 marks)

(ii) Elaborate on the different pseudo random number generation methods. (5 marks)

[4 × 15 = 60 marks]