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BICS-014

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B.Tech. IN COMPUTER SCIENCE AND ENGINEERING (BTCSVI)

Term-End Examination

June, 2012

BICS-014 : DESIGN AND ANALYSIS OF ALGORITHM

Time : 3 Hours *Maximum Marks : 70*

Note : *Seven (7) questions are required to be answered. From the last question (question no. 10 short note type)* ***any two*** *(2) are to be attempted.*

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1. (a) What is RAM model ? Explain asymptotic notations in brief. **2+3=5**

(b) Can the master method be applied to the recurrence **5**

$T(n) = 4T\left(\frac{n}{2}\right) + n^2 \lg n$. Why or why not ?

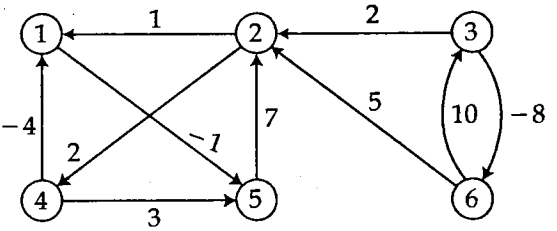
2. What is heap-sort ? Write down the algorithm of heap-sort. Illustrate the operation of heap-sort on the following array : **1+4+5=10**

A = <5, 13, 2, 25, 7, 17, 20, 8, 4>

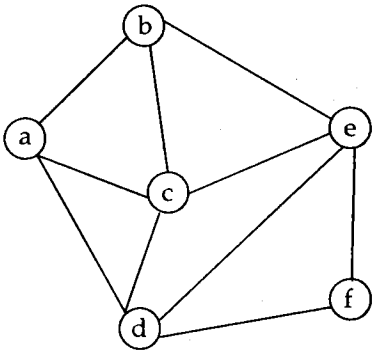
3. (a) What is amortized analysis ? Explain the different methods of amortized analysis in brief. **2+3=5**

(b) Show that the amortized cost of incrementing a binary counter is 0(1) **5**

4. (a) Apply Floyd-Warshall algorithm for constructing shortest path for the following graph 5



(b) Consider a graph G = (V, E) shown below. Find a Hamiltonian circuit using back tracking method. 5



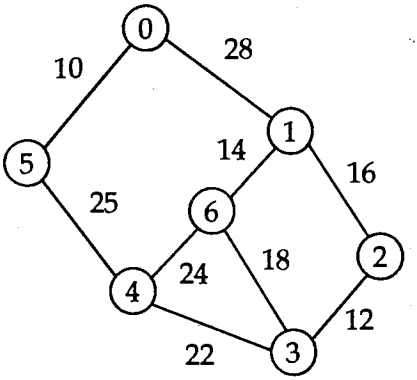
5. (a) What is P, NP, Co-NP, NP-Hard and NP-Complete problem ? 5

(b) Prove that vertex-cover is NP Complete. 5

6. What is dynamic programming ? How it is different from greedy approach ? Explain its characteristics with example. **1+2+7=10**

7. Write down the "Dixon's integer factorization algorithm" stepwise. **10**

8. What is minimum spanning tree ? Generate minimum cost spanning tree for the following graph using Prim's algorithm. **2+8=10**



9. What is approximate algorithm ? Explain the Travelling-Salesman problem. **3+7=10**

10. Write short notes on - (*Any two*) : **5+5=10**

(a) Amortized analysis

(b) Greedy algorithm

(c) Randomized algorithm

(d) Applications of Design and Analysis of Algorithm.