

**M. TECH. –II (COMPUTER ENGINEERING) (CBCS – 2015
COURSE) : WINTER - 2017
SUBJECT: ADVANCED COMPUTER ALGORITHMS**

Day: **Tuesday**
Date: **28/11/2017**

Time: **11.00 AM TO 02.00 PM**
Max Marks: 60

W-2017-2805

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Assume suitable data, if necessary.

SECTION-I

- Q.1** What is Random Access Machines (RAM)? With neat labeled diagram (10) illustrate the working of RAM with an example.
OR
What do you understand by Primitive model of Computation? Illustrate with (10) example the various operations performed by Multi Tape Turing Machine.
- Q.2** What is Backtracking? Explain how backtracking addresses the eight queen (10) problem?
OR
What is an algorithm? Suggest the characteristics of algorithm. Explain the (10) average and worst case analysis with an example.
- Q.3** Devise a 'binary' search algorithm that splits the set not into two sets of equal (10) sizes but into two sets, one of which is twice the size of the other. How does this algorithm compare with binary search?
OR
Show that prim's algorithm can, like kruskal's algorithm be implemented using (10) heaps. Show that it then takes a time in $\theta(a \log n)$.

SECTION-II

- Q.4** Show by giving an explicit example that if the edge lengths can be negative (10) then Dijkstra's algorithm does not always work correctly? Is it still sensible to use shortest path if negative distances are allowed? Justify.
OR
Write an algorithm that multiplies two $n \times n$ matrices using $O(n^3)$ operations. (10) Determine the precise number of multiplications, additions and array element accesses.
- Q.5** What is dynamic programming? Show that the computing time of function (10) OBST is $O(n^2)$
OR
Write a backtracking algorithm for m graph coloring and analyze it. (10)
- Q.6** What are P and NP problems? Give atleast five problems that can be classified (10) as NP problems.
OR
What are intractable problems? What is the need to study such problems and (10) explain the contribution of Cook's theorem in analyzing such problems?

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