

B.TECH SEM – V (2007 COURSE) (INF. TECH.) : WINTER - 2017
SUBJECT : ADVANCED DATA STRUCTURES

Day : **Thursday**
 Date : **11/01/2018**

W-2017-2469

Time : **02.30 PM TO 05.30 PM**
 Max. Marks : **80**

N.B.

- 1) **Q.1 and Q.5 are COMPULSORY.** Out of the remaining attempt any **TWO** questions from each section.
- 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** a) Write a short note on Red-black tree along with insert and delete operations. **(05)**
 b) Describe Divide and Conquer with respect to their unique characteristics, control abstraction and an example. **(05)**
 c) Explain characteristics and uses of greedy strategy. **(04)**
- Q.2** a) Construct AVL tree for following data MP, MBS, MMT, NCP, AI, ACA, OOCS, OC, DS, OOP, OOMD. **(07)**
 b) Explain the relationship between data structure and algorithm in the process of problem solving with an example. **(06)**
- Q.3** a) Prove how divide and conquer is the best suitable algorithm strategy for Binary Search. **(07)**
 b) What is Heap? Explain mapping of Heap with array. **(06)**
- Q.4** a) What is optimal Huffman code for the following set of frequencies, based on first 8 fibonacci numbers? **(07)**
 a:1 b:1 c:2 d:3 e:5 f:8 g:13 h:21
 Can you generalize your answer to find the optimal code when the frequencies are the first n-Fibonacci numbers?
 b) Find the optimal, schedule for the following task with given weights (penalties) and deadlines. **(06)**

Task	T₁	T₂	T₃	T₄	T₅	T₆	T₇
d_i	4	2	4	3	1	4	6
w_i	68	55	50	38	30	18	12

SECTION – II

- Q.5** a) Explain Dynamic programming. **(04)**
 b) Define 8 queens problem. **(05)**
 c) Explain limitations of binary searching and internal sorting. **(05)**
- Q.6** a) Write the formula to find the shortest path using Floyd's approach. Use Floyd's method to solve all-pairs shortest path problem. **(07)**
 b) Explain term multistage graph with suitable example. **(06)**
- Q.7** a) Differentiate between back tracking and branch and bound algorithm. **(07)**
 b) Explain lower bound theory and how it is used in solving algebraic problem. **(06)**
- Q.8** a) Explain how breadth first search can be used to check connectness of a graph and also to find the number of components in graph. **(07)**
 b) Construct binary tree having following frequencies: **(06)**
 i) ABCDEFGHI ii) BCAEDGHFI