

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION- September, 2018

M. Tech I Semester

COURSE CODE: 10M11CI111

MAX. MARKS: 15

COURSE NAME: Advanced Data Structures

COURSE CREDITS: 3

MAX. TIME: One Hour

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

- Q1. (a) On what criteria a point set is considered as valid BST execution?
(b) Is there an online BST algorithm that beats $O(\lg n)$? If yes, name it.
(c) When a pair of rectangles is accounted as independent?
(d) Define key-independent optimality and give an example.
(e) How probability of false positive w.r.t. Bloom Filter is calculated?
(f) Why Cuckoo hashing can be tricky to analyze? (1*6)
- Q2. State and explain Wilber's first lower bound with an example. (1, 2)
- Q3. State possible properties of BST algorithms that guarantee certain access time bounds for specific input sequences. (2.5)
- Q4. Consider inserting the keys {14, 56, 85, 20, 32, 72, 96, 45, 63, 100} into a hash tables of size $m = 11$ using Cuckoo Hashing with hash functions: $h_1 = \text{key} \% 11$ and $h_2 = (\text{key} / 11) \bmod 11$. (3.5)