
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
CS21003 Algorithms I: Third Class Test 2022 Spring

Date of Examination: 26th March 2022

Duration: 30 minutes + 5 minutes (for scanning, concatenating, and uploading)

Full Marks: 20

Subject: CS21003 Algorithms I

Part I

1. A tree is called a ternary tree if every node has at most 3 children. Let us call a ternary tree KGP tree if, at every node x , the difference between the height of all the subtrees rooted at the children of x differ by at most 5. Find the asymptotic behavior of the maximum height of any KGP tree with n nodes.

[10 Marks]

2. Show that any comparison-based algorithm for finding the median of an integer array of size n must use at least $\Omega(n)$ comparisons.

[10 Marks]

All the best
