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