PVMT 2022: Combo Tiebreakers

Problem 1

Find how many ways there are to permute the following string: PVMT2022

(For instance, PVMT2022, 2022PVMT, PVT20M22 are all valid permutations)

Problem 2

Let S be lattice cube with opposite corners $(1,1,1)$ and $(-1,-1,-1)$. You start at $(1,1,1)$, and each move you can move one unit in any direction, as long as you stay on a lattice point in the cube S. How many ways are there to get to $(-1,-1,-1)$ in as few moves as possible without going through the center of any face?

Problem 3

I have a bag with 43 marbles, 14 of them blue, the rest are different, individual colors. Let there be N ways to choose 14 of the marbles, find $\log_2 N$.