**7. A stack of papers (8 points)** — *Taavet Kalda and Jaan Kalda.*

There is a pack of $N \gg 1$ identical sheets of papers lying on an infinite horizontal table. The coefficient of friction between the surface of the table, and between two sheets of paper are both equal to $\mu$. Each sheet has dimensions $L \times W$, with $L > W$. Sandra is trying to fetch the bottom-most sheet by pulling from a shorter edge of it with a constant velocity $u$ (while all the sheets lie almost exactly on top of each other, she managed to get hold of an edge of the bottom-most sheet).

**i)** *(2 points)*Sketch a qualitative graph of how the acceleration $a$ of the pack (excluding the bottom-most sheet) depends on time when
(a) the speed $u$ is very small.
(b) the speed $u$ is very big.

**ii)** *(3 points)* What is the minimal speed $u_{\min}$ by which it is possible to pull the bottom-most sheet out (i.e. separating it completely from the remaining pack)?

**iii)** *(1 point)* Assuming $u > u_{\min}$, what is the speed of the remaining pack at the moment when the bottom-most sheet gets out of the pack (i.e. there is no longer overlapping areas)?

**iv)** *(2 points)*Considering still $u > u_{\min}$, what is the minimal distance $l$ between the pack of papers and the edge of the table such that the pack would not slide over the edge of the table? ($l$ is the maximal allowed travel distance of the pack.)