Theories with NIP, List 2

We work in a monster model $\mathfrak{C}$ of a complete theory T.

Problem 1. Let p be a global A-invariant type.
(i) Prove that each Morley sequence in p over A is A-indiscernible.
(ii) Let $\mathcal{I}$ be a linear order. Prove that the type over A of a Morely sequence $(a_i)_{i\in\mathcal{I}}$ in p over A does not depend on the choice of $(a_i)_{i\in\mathcal{I}}$.
(iii) Let I be an infinite Morley sequence in p over A, and let J be an infinite A-indiscernible sequence. Prove that J is a Morley sequence in p over A if and only if $J \equiv_A^{EM} I$.

Problem 2. (i) Let p, q be global types definable over A. Prove that $p \otimes q$ is also definable over A. Deduce that for every $n \leq \omega$, $p^{(n)}$ is definable over A, too.
(i) Let p, q be global types finitely satisfiable in A. Prove that $p \otimes q$ is also finitely satisfiable in A. Deduce that for every $n \leq \omega$, $p^{(n)}$ is finitely satisfiable in A, too.

Problem 3. Assume T has NIP. Let I be an endless indiscernible sequence, and $p = \lim(I) \in S(\mathfrak{C})$. Let $J = (b_j)_{j\in\mathcal{J}}$ be a sequence satisfying $b_j \models p|Ib_{>j}$ for all $j \in \mathcal{J}$ (i.e. $(b_j)_{j\in\mathcal{J}^*}$ is a Morley sequence in p over I). Prove that $I + J$ is indiscernible.

Problem 4. Let p be a generically stable type invariant over A, and let q be a non-forking extension of $p|A$. Prove that if $(a_0, \ldots, a_{n-1})$ satisfies $a_i \models q|Aa_{<i}$ for all $i < n$, then $(a_0, \ldots, a_{n-1})$ is a Morley sequence in p over A.
Hint. Argue by induction on n. You can use various parts of the relevant theorem, namely that generic stability implies items (i) and (iv) of that theorem.

Problem 5. Let $L = \{R_n(x, y) : n < \omega\}$ and M be an L-structure with universe $\mathbb{Q}$ such that $M \models R_n(x, y) \iff (x < y \text{ and } |x - y| < n)$. Let $T = \mathrm{Th}(M)$.
(i) Does T have quantifier elimination?
(ii) Show that the theory of ordered divisible abelian groups is o-minimal, and so has NIP. Deduce that T has NIP.