4. a

Assuming that $k=2$, then $D_t = \{d_{t1}, d_{t2}\}$.
For $t=1$ $D_1 = \{d_{11}, d_{12}\}$. We don't know which car so $E_{1k} = \{e_{11}, e_{12}\} = \{d_{11}, d_{12}\} = \{d_{12}, d_{11}\}$.

Lets think that $E_{1k} = \{d_{11}, d_{12}\}$ then

$$P(C_{11}=c_{11}, C_{12}=c_{12} \mid E_{1k} = \{d_{11}, d_{12}\}) \propto p(c_{11})p(c_{12}) \times$$
$$\times P(E_{1k} = \{d_{11}, d_{12}\} \mid C_{11}=c_{11}, C_{12}=c_{12})$$

Position of these cars are independent

$$P(C_{11}=c_{11}, C_{12}=c_{12} \mid E_{1k} = \{d_{11}, d_{12}\}) \propto p(c_{11})p(c_{12}) \times$$
$$\times p_N(d_{11}, \|a_1 - c_{11}\|, \partial^2)\, p_N(d_{12}, \|a_2 - c_{12}\|, \partial^2).$$

Similary for $E_{1k} = \{d_{12}, d_{11}\}$. So for $k=2$ we have to average over 2 posible E_{1k}

$$P(C_{11}=c_{11}, C_{12}=c_{12} \mid E_1) \propto \frac{1}{2} \sum_{k=1}^{2} p(c_{11})p(c_{12})\, p_N(e_{11}, \|a_1 - c_{11}\|, \partial^2)\, p_N(e_{12}, \|a_2 - c_{12}\|, \partial^2)$$

46.

Let's assume that $P(C_{i1}, \ldots C_{ik})$ achieves the maximum value. If we permute $C_{i1}, \ldots C_{ik}$, it will get the maximum value as $p(c_{ii})$ is the same. Since there're k cars, there're $k!$ possible ways to order the distance readings $d_1, \ldots, d_k$. So the number of cars locations that maximize $P(C_{i1}, \ldots C_{ik} | E_1 = e_1)$ is $k!$

4C.

We compute k car locations for each time step, so we have T×k factor graph. The treewidth of this factor graph is min (T, k).

5.a.

As to formal definition of ethics dumping Arizona's proposal could be considered as ethics dumping. Because testing would be without any restrictions which isn't meet the goal of testing (to test the vehicle in the real world conditions) If company's engineering team would like to test their vehicle in the real roads situations they should do this in California standards. In this way the results would be more accurate and they could make adjustments more precise.

56.

The researcher is responsible for the discovery of the technology, scientific breakthrough but not for the certain usage of this technology. When you make some research you're usually solve certain problem. In this particular moment you as a researcher, do not think of how the results of your work would be implemented in other way. With such thoughts would be no progress. And it's not bad thing that technology has dual use. It's also important to improve countries defense capabilities.