CS 221 NER

#3 a) Treewidth = 2 because there is a cycle. Any order of elimination

b) $p(y_t \mid y_{t-1}, x; \theta) =$

$$\frac{G_t(y_{t-1}, y_t, x; \theta) \cdot G_{t+1}(y_t, y_{t+1}, x; \theta)}{\sum_{y_t} G_t(y_{t-1}, y_t, x; \theta)\, G_{t+1}(y_t, y_{t+1}, x; \theta)}$$

d) $p(y_S \mid y_{-S}, x; \theta) =$

$$\frac{\prod_{i, i-1 \in S} G_i(y_{i-1}, y_i, x; \theta)}{\sum_{y_t} \prod_{i, i-1 \in S} G_i(y_{i-1}, y_i, x; \theta)}$$

if $i \in S$, $y_i = y_S$
if $i-1 \in S$, $y_{i-1} = y_S$