2. (a) Consider the following grammar, assuming S is the start symbol:

$$\begin{array}{lcl} S & \rightarrow & A\ \texttt{\#} \\ A & \rightarrow & A\ z \mid B\ y \\ B & \rightarrow & A\ x \mid x\ y \mid \epsilon \end{array}$$

Calculate the *First* and *Follow* sets (where applicable) for S, A, and B. Show the steps taken to reach your solution. [10]

(b) Draw the *Characteristic LR Automaton* for this grammar and write, for each state, the closure of items matched at that state. [10]

(c) Explain the need to calculate *Nullable* sets when calculating *First* sets. [5]