Name ________________________________

Please give a BNF grammar for each of the following languages specified below. For example, a correct answer for “the set of all strings consisting of zero or more concatenated copies of the string ab” would be this grammar:

\[
\begin{align*}
\langle S \rangle & ::= \text{ab } \langle S \rangle \mid \text{<empty>}
\end{align*}
\]

1. The set of all strings consisting of zero or more instances of the character a.

2. The set of all strings consisting of an uppercase letter followed by zero or more additional characters, each of which is either an uppercase letter or one of the decimal digits 0 through 9.

3. The set of all strings consisting of the keyword begin followed by zero or more statements with a semicolon after each one, followed by the keyword end. Use the non-terminal \langle statement\rangle, but do not provide productions for it.

4. The set of all strings consisting of an open bracket (the symbol [) followed by a list of zero or more decimal digits separated by commas, followed by a closing bracket (the symbol ]).

5. The set of all strings consisting of zero or more instances of the character a, with a comma appearing between each a and the next. There should be no comma before the first a or after the last a.