Part (b)

We will use $L$ to denote the language $\{a^i b^i c^i | i \leq n \}$. For any constant $n > 0$, take a string to be $z = a^n b^n c^n$. Clearly $z \in L$. Now, the string will be decomposed into $z = u v w x y$, with $v w x \neq \epsilon$ and $|v w x| \leq n$. We then have several cases to consider:

- $v w x \in a^+$
  
  Pump up, and we will have more $a$’s than $b$’s. It does not belong to $L$.

- $v w x \in b^+$
  
  Pump up, and we will have more $b$’s than $a$’s. It does not belong to $L$.

- $v w x \in c^+$
  
  Pump up, and we will have more $c$’s than $a$’s and $b$’s. It does not belong to $L$.

- $v w x \in a^+ b^+$
  
  Pump down, and we will have less $a$’s and $b$’s than $c$’s. It does not belong to $L$.

- $v w x \in b^+ c^+$
  
  Pump up, and we will have more $c$’s than $a$’s. It does not belong to $L$.

Note that it is impossible to have $v w x \in a^+ b^+ c^+$, since $|v w x| \leq n$. So we have finished the proof that $L$ is not a CFL.