Automata Assignment 3:
Due Date: Monday Nov 25, 2024

Please submit the hard copy in the class or with your course instructor. Also submit the soft form on gcr.

Question No 1: Convert to CNF:

1. S → SS I a
2. S → aXX
   X → aS I bS | a
3. E → E + E
   E → E*E
   E → (E)
   E → 7

The terminals here are + * ( ) 7.

4. S → AAB | AB
   A → aA | aA | a
   B → Bb | bB | Bb | b | aA | aA | a | bb

Question No 2: Convert to GNF:

1. S → AA | BA |AB
   A → AX | a
   X → Aa | a
   B → b

2. S → aS | bS | BB | aC
   A → aA | a
   B → Bb | bB
   C → cc | cC

3. S → ABABAB
   A → a | Λ
   B → b I Λ

Question No 3: Design PDA for the following:

1. Palindrome
2. $a^n b^m c^m d^n e^p f^p g^q h^q$

3. $a^n b^n c^m d^{4m}$
4. the language that never contains the substring ‘abb’.