Department of Computer Science & Engineering

National Institute of Technology Srinagar

Assignment No: 4 Due Date: 15/06/2020

(Theory of Computation)

Q1. Obtain a right linear grammar for the language $L = \{a^n b^m \mid n \geq 2, m \geq 3\}$.

Q2. Obtain a (i) right linear, and (ii) left linear grammar for the regular expression $((aab)^*ab)^*$.

Q3. Obtain a left linear grammar for the right linear grammar shown below:

S → abA
A → baB
B → aA |bb

Q4. Show that $L = \{ a^i b^j \mid i > j \}$ is not regular.

Q5. Show that $L = \{ a^{n!} \mid n \geq 0 \}$ is not regular.

Q6. Show that $L = \{ w \mid n_a(w) = n_b(w) \}$ is not regular.

Q7. Obtain a CFG on (a, b) to generate a language $L = \{a^n w w^R b^n \mid w \in \sum^*, n \geq 1\}$.

Q8. Obtain a CFG on (a, b) to generate a language $L = \{a^n b^m \mid m > n \text{ and } n \geq 0\}$.

Q9. Obtain a CFG on (a, b) to generate a language consisting of equal number of a's and b's.

Q10. Obtain the string aaabbabbba by applying left most derivation and the parse tree for the grammar shown below. Is it possible to obtain the same string again by applying leftmost derivation but by selecting different productions?

S → aB | bA
A → aS | bAA| a
B → bS | aBB | b

Q11.Show that the following grammar is ambiguous

S → aSbS
S → bSaS
S → ε