Department of Computer Science & Engineering
National Institute of Technology Srinagar

Theory of Computation | 6^{th} Sem | Spring 2020
Assignment No. 2 | Due date: 24-05-2020

Section I

Q1. Obtain a grammar to generate the language $L = \{ 0^n 1^{n+1} \mid n \geq 0\}$.

Q2. Obtain a grammar to generate the language
$L = \{ w w^R \mid w \varepsilon \{a,b\}^* \}$ where w^R is reverse of w.

Q3. Obtain a grammar to generate the language $L = \{ 0^n 1^{2n} \mid n \geq 0\}$.

Q4. Obtain a grammar to generate the language $L = \{ a^{n+2} b^m \mid n \geq 0$ and $m > n\}$.

Q5. Obtain a grammar to generate the language $L = \{w : \mid w \mid \bmod 5 = 0\}$ on $\sum = \{a\}$.

Q6. Obtain a grammar to generate the set of all strings with no more than three **a's** when $\sum = \{a, b\}$.

Section II

Q1. Obtain a RE to accept strings of 0's and 1's having no two consecutive zero's.

Q2. Obtain a RE to accept words with two or more letters but beginning and ending with the same letter, where $\sum = (a, b)$.

Q3. Obtain a RE to accept a string not ending with 001.

Q4. Obtain RE for $L = \{ a^n, b^m, c^p \mid n \leq 4, m \geq 2, p \leq 2\}$.

Q5. Find DFA's to accept the following languages:

(i) $L(00^* + 010^* 01)$
(ii) $L(0(0 +1)^* 11)$

Q6. Construct an NFA for the RE's

(i) $(0+1)^* (00+11) (0+1)^*$

(ii) $10 + (0 +11) 0^* 1$

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 $L = \{a^n b^m \mid m > n \text{ and } n \geq 0\}$.