JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION-OCT. 2018

B.Tech. V$^{th}$ Semester

COURSE CODE: 10B11CI513                                    MAX. MARKS: 25

COURSE NAME: Theory of Computation

COURSE CREDITS: 04                                          MAX. TIME: 1.5 hr

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.* ε represents empty string.

**Ques 1:** Convert the following CFG to PDA.                **[3 MARKS]**

S → 0A1 | 0BA,    A → S01 | 0,  B → 1B | 1

**Ques 2:** Find a CFG for the complement of the regular expression RE= 00*11*    **[4 MARKS]**

**Ques 3:** Given the following ambiguous context free grammar    **[4 MARKS]**

S → Ab | aaB          A → a | Aa          B → b

(a) Find the string 's' generated by the grammar that has two leftmost derivations. Show the derivations.

(b) Show the two derivation (parse) trees for the string 's'.

**Ques 4:** Construct a Moore machine which takes a binary number and replaces the first 1 with a 0 from every substring starting with 1. For example, 0001001110 becomes 0000000110. This type of "bit stuffing" may be used in data transmission and telecommunications for run-length coding to limit the number of consecutive bits of the same value. A bit of the opposite value is inserted after the maximum allowed number of consecutive bits.    **[4 Marks]**

**Ques 5:** Convert a CFG from the following language. Convert that CFG into Chomsky normal form.

L = {a$^n$b$^m$c$^k$ | n = m or m <=k ; n, m, k >=0 }    **[5 Marks]**

**Ques 6:** Construct the PDA for the following language    **[5 Marks]**

L = {a$^n$ b$^m$ c$^k$ | 2n=m and k>=2}