**United College of Engineering & Research, Prayagraj**

**Department of Computer Science & Engineering**

**Automata Theory(KCS-402)**

**Assignment-4**

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| **Q. No.** | **Question** | **CO** | **Bloom’s level** |
|  | **Section-A** |  |  |
| 1 | What do you mean by Two stack Pushdown Automata? | CO5 | L1 |
| 2 | Define Deterministic Pushdown Automata(DPDA). | CO5 | L1 |
| 3 | Design PDA for L = {anbm ! m,n > 0}. | CO5 | L2 |
| 4 | Can we make Deterministic Pushdown Automata for the language L={wwR | w{a,b}\* }? Justify. | CO5 | L2 |
| 5 | Is the power of PDA and DPDA equal? Justify. | CO5 | L1 |
|  | **Section-B** |  |  |
| 6 | Convert the grammar S🡪aAA, A🡪a|aS|bS to a PDA that accepts the language by empty stack. | CO5 | L3 |
| 7 | Design a PDA for the following language: L = {ai bj ck | i = j or j = k} | CO5 | L4 |
| 8 | Design a PDA for the Language L ={wwR | w{a,b}\* } | CO5 | L3 |
| 9 | Construct a PDA from the following CFG.  G = ({S, X}, {a, b}, P, S)  where the productions are –  S → XS | ε , A → aXb | Ab | ab | CO5 | L2 |
| 10 | Consider the CFG ({S, A, B} {a, b}, P, S), where productions P are as follows:  S🡪aABB/ aAA,  A🡪aBB/a,  B🡪bBB / A.  Convert the given grammar to PDA that accept the same language by empty stack. | CO5 | L2 |
| 11 | Obtain PDA to accept all strings generated by the language, L={an bm an ! m, n ≥1}. | CO5 | L3 |
| 12 | Prove that language recognized by final state PDA is also recognized by empty stack PDA and vice-versa i.e. L(M) = N(M). | CO5 | L3 |
| 13 | Construct PDA for the following language L = {anbmcmdn ! m, n ≥1}. | CO5 | L4 |
| 14 | Consider following PDA:-  M= ( {q0},{0,1},{a,b,Z0}, δ,q0,Z0, Ø )  Where, δ is defined as following:-  δ (q0,0, Z0) = (q0, aZ0)  δ (q0,1, Z0) = (q0, bZ0)  δ (q0,0, a) = (q0, aa)  δ (q0, 1, b) = (q1, bb)  δ (q0, 0, b) = (q0, ε)  δ (q0,1, a) = (q0, ε)  δ (q0, ε, Z0) = ( q0, ε)  Convert this PDA into corresponding CFG. | CO5 | L3 |
| 15 | Let G be a CFG and its language is L(G). How do you decide that L(G) is finite? | CO5 | L2 |

**CO** - Course Outcome

**Bloom’s Levels**

1- Remembering 2-Understanding 3-Applying

4-Analyzing 5-Evaluating 6-Creating