**DARBHANGA COLLEGE OF ENGINEERING, DARBHANGA**

[MID-SEM EXAMINATION] Time-2 hours

Sub-FLAT

Total Marks-20

Branch -CSE [VI-SEM]

Group-A is compulsory. Answer any one from Group-B.

[GROUP-A]

1) Assess(check) given language is regular or not? Marks=8

1. L={ ai bj ck / i, j >=1}
2. L={ x wwR y / x, y, w Ꜫ (0,1)+ }
3. L={ w x wR  / w Ꜫ (0,1)+ ,|x|=5}
4. L={ x wwR  / x, w Ꜫ (0,1)+}
5. L={ wwRx / x, w Ꜫ (0,1)+}
6. L={ w xwR  / x, w Ꜫ (0,1)+}
7. L={ w wwR  / w Ꜫ (0,1)+}
8. L={ an bn+m cm / n, m >=1}

2) Construct minimal DFA for the language L={na(w)mod3=0} if w Ꜫ (a,b). Marks=2

3) Define Chomsky hierarchy of languages Marks=5

OR

Differentiate Deterministic Pushdown Automata (DPDA) and Non-Deterministic Pushdown Automata.

[GROUP-B]

*Each question contains 5 marks.*

4) Explain individually classes P and NP.

(5) Write short notes on NP complete, NP hard problems.

(6) Define Universal Turing Machine.