b) Construct basic blocks and data flow graph and identify loop invariant statements:

```
for (i =1 ton)
{
    j = 1
  While ( j < n)
    {
  A = B * C / D;
    j = j+1;
    }
}
```


******

Total No. of Questions :10] *[Total No. of Printed Pages :4*

Roll No .....

IT - 713

B.E. VII Semester

Examination, December 2013

Automata and Compiler Design

Time : Three Hours

Maximum Marks : 70

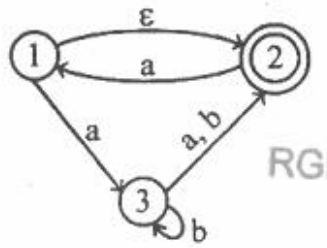
Note: Attempt all questions. All questions carry equal marks.

Unit - I

1. a) Construct minimum state DFA for the following regular expression:

$(a/b)* a(a/b)(a/b)$

b) Construct the following NDFA to deterministic finite automata.



OR

2. a) Construct DFA for the following regular sets:
   i) All strings of '0' and '1' that do not contain the substring 011.
   ii) All strings of '0' and '1' ended with 011.

b) State and prove ARDEN's theorem.

3. a) What are the tasks performed by the compiler in the lexical and syntax analysis phase.

   b) Consider a grammar G, S → Sa S/b, show that G is ambiguous for string 'bababab'.

OR

4. a) Consider the grammar:

   S → aBDh

   B → cC

   C → bc/ε

   D → EF

   E → g/ε

   F → f/ε

   Construct the predictive parsing table.

   b) Write short notes on:

   i) Boot strapping ii) Top Down Parser

5. a) Consider the grammar:-

   S → ACB/CbB/Ba

   A → da/BC

   B → g/ε

   C → h/ε

   Calculate FIRST and Follow.

   b) Generate the three address code for

```
while (i < 10)
  {
    x = 0;
    i = i+1;
  }
```


OR

6. a) Consider the following 'while' statement:

   While A > B and A <= 2* B – 5 do A : = A + B;

   i) Construct the parse tree for the given above statement

   ii) Write the intermediate code for while statement.

   b) What are the problems encountered in code generation?

7. a) Differentiate between static and dynamic storage allocation?

   b) What is activation record? Give the general activation record fields and their purpose.

OR

8. Write short notes on:

   i) Lexical phase Error

   ii) Semantic Errors

   iii) Data structures used in symbol table

   iv) Symbol table management.

9. a) Construct the DAG for the following basic block

   D : = B * C

   E : = A+B

   B : = B * C

   A : = E – D

   b) Explain the peephole optimization?

OR

10. a) Explain the principal sources of optimization with suitable example.