Roll No. | | | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

INFORMATION TECHNOLOGY

4TH Semester

IT 9251 & FORMAL LANGUAGE & AUTOMATA

(Regulations 2008)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Define DFA.
2. Define the principal of Mathematical induction.
3. Write the regular expression for the language of all string containing exactly two zeros.
4. List all the closure property of regular language.
5. Define λ-closure on any state.
6. Let G be the grammer S-> aB / bA, A->a /aS / bAA, B-> b / bS / aBB. For the string aaabbabbba find a leftmost derivation.
7. Define normal forms.
8. What are different ways in which a PDA accepts a language?
9. When the language is said to be recursive or recursively enumerable?
10. Write the programming techniques of Turing machine?

Part – B (5 x 16 = 80 marks)

11. (i)Design a Turing machine that accepts both odd and length palindrome string. (8)

    (ii) Write the moves o validate the following string by tracing the above design,
    1) ababa 2) aaba (8)

12. a) Draw an NFA –λ recognizing the language (0+1)* (01)* and convert to Finite automata (16)

(OR)

b) (i) Let P(n) be the statement 1+2+3+...+n=n(n+1)/2. Show that P(n) is true for every n >=0 (8)

(ii)Prove that L = { 0i 1i } is not a regular language using pumping lemma (8)

13. a) (i) Write the procedure to find the regular expression for the finite automata (8)

(ii) find a regular expression for FA given in Figure 1 (8)

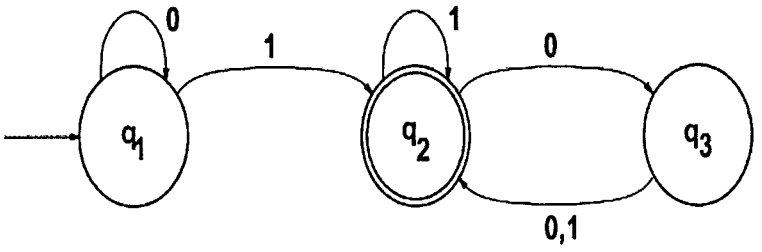

Figure 1

(OR)

b) (i) Write the procedure to minimize the finite automata (8)

(ii) Minimize the finite automata given in Figure 2 (8)

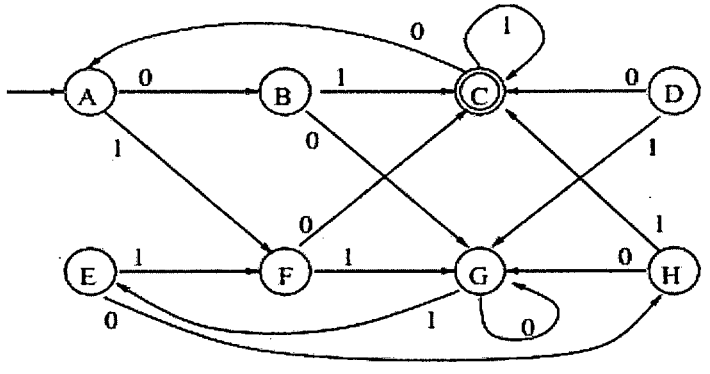

Figure 2

14. a) (i) Define Ambiguous Grammer? Show that the CFG with the following productions is Ambiguous S-> a/ Sa/ bSS / SSb/SbS (8)

(ii) Convert the following production to CNF
S-> AB / BaB A-> aA / Ba / aa B-> bBb / a (8)

b) (i) Convert the following production to GNF (8)
E -> E+T / T T-> T*F / F F-> (E) / id

(ii) Construct a TM to compute the function $f(x) = x + 2$ where the input x be represented in Unary notation (8)

15. a) Consider a grammer with the following productions: S → AB, A → aAa, A → ε, B → bBb, B →ε. Is this grammar LL(1)? Check for a string aabb Є L or not? (16)

b) Explain bottom-up parser with an example (16)