CS/IT 313

Hall Ticket Number:

III/IV B.Tech (Supplementary) DEGREE EXAMINATION

April, 2018 — **Common to CSE/IT**

Fifth Semester — **Automata Theory And Formal Languages**

Time: Three Hours — **Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

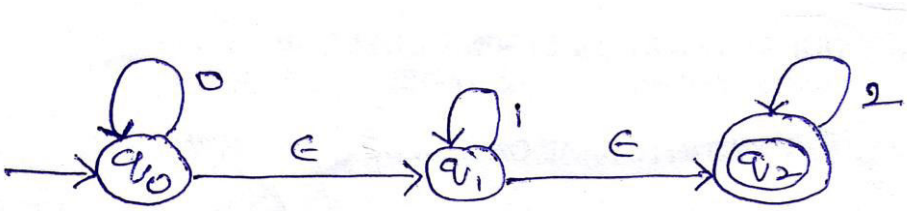
1. Answer all questions (1X12=12 Marks)
   a) What is meant by concatenation of strings?
   b) Write the basic limitation of an FSM.
   c) Define deterministic Finite Automata.
   d) Define regular set.
   e) Write the language for the given regular expression r = a*b*b.
   f) What is meant by ambiguity of a grammar?
   g) State pumping lemma.
   h) Define Parse tree.
   i) Define PDA.
   j) Give an example on context free languages.
   k) Define Turing machine.
   l) What is meant by post's correspondence problem?

UNIT I

2. a) Give DFA accepting the set of all strings containing 1101 as a substring over the alphabet {0, 1}. 6M
   b) Define NFA .Explain the process of converting an NFA to DFA 6M

(OR)

3. a) Define Finite Automata .Why is an FA with ε transition called NFA? What is the necessity of an NFA with ε transition? 6M
   b) Find an equivalent NFA without ε transitions for the FA with ε transitions shown below Give also the transition table.



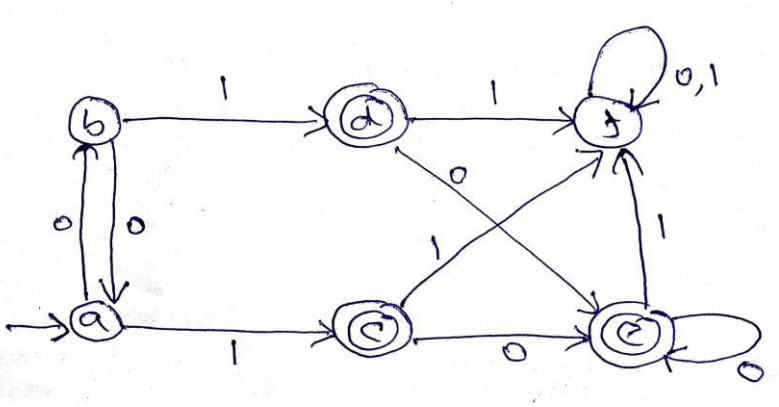
6M

UNIT II

4. a) Show that L = $\{a^p/p$ is a prime$\}$ is not regular using pumping lemma. 6M
   b) Construct the Finite Automata equivalent to the regular expression r = ab (aa+bb)(a+b)*b 6M

(OR)

5. a) If L and M are languages prove that L∩M is regular 6M
   b) Reduce the following DFA



6M

UNIT III

6. a) Explain context free grammars. Describe derivation trees with examples. 6M
   b) Prove that the following grammar is ambiguous.
   S→a/abSb/aAb
   A→bS/aAAb 6M

(OR)

7. a) Design a PDA which accepts an odd palindrome. 6M
   b) Construct a PDA equivalent to the following grammar.
   S→aAA
   A→aS/bS/a 6M

UNIT IV

8. a) Show that CFL's are not closed under intersection. 6M
   b) What are move and instantaneous description of a Turing machine? 6M

(OR)

9. a) Prove that if L is a recursive language so is $\bar{L}$ 6M
   b) Explain about the programming techniques for Turing machine. 6M