SE (Sem-IV) (CBGS) [Information Technology] 08/12/2016

Nov-Dec-2016 AT

Q. P. Code : 549702

(3 Hours) **[Total Marks : 80**

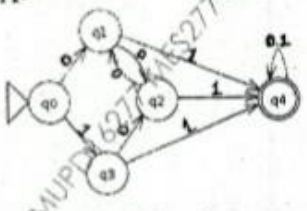
N.B. : (1) Attempt any **Four** questions.
(2) Draw suitable **diagram** whenever **necessary**.
(3) Assume suitable **data**, if **necessary**.

1. Attempt **four** sub questions.
   (a) State applications where Automata Theory is used. 5
   (b) What are limitations of finite automata. 5
   (c) Develop an NF A to accept strings ending with 'aba' over {a , b} 5
   (d) Explain with example equivalence between NFA & DFA. 5

2. (a) Consider the grammar G = { (S, A), (0, 1), P, S }, where P consists of : 10
   (i) $S \rightarrow 0AS \mid 0$ (ii) $A \rightarrow S1A \mid SS \mid 10$
   Show the leftmost and rightmost derivation for the input string '001100'. Is given G Ambiguous?
   (b) Construct deterministic PDA to recognize $a^n abb^n$, $n > 0$ over{ a,b} 10

3. (a) Define Normal form and its types and Convert given grammar to CNF: 10
   (i) $S \rightarrow bA \mid aB$ (ii) $A \rightarrow bAA \mid aS \mid a$ (iii) $B \rightarrow aBB \mid bS \mid b$
   (b) Define CFG and construct a CFG for $a^{2n}b^n$ 10

4. (a) Design mealy machine to accept all strings ending with aa or bb 10
   (b) Minimize given DFA- 10



5. (a) Develope ε -NFA to accept $0^n 1^n 2^n$, where n >= 0 over { 0,1 ,2} 5
   (b) Define Halting problem 5
   (c) Give Regular Expressions for- 6
   (i) Binary strings containing atleast one 11 & atleast one 00
   (ii) Strings with even number of a's
   (iii) Strings in which third symbol from end is 'c' over { a,b,c}
   (d) Describe Regular Language for given Regular Expressions 4
   (i) (ab+ba)*,
   (ii) 1(0+1)(0+1) (0+1) (0+1)* 0

6. (a) Write short note on - Chomsky Hierarchy 7
   (b) Explain Post correspondence problem 7
   (c) Explain Pumping Lemma for Regular Language 6
