PVP 14

Code: CS3T4

II B.Tech - I Semester – Regular/Supplementary Examinations
November - 2019

FORMAL LANGUAGES AND AUTOMATA THEORY

(COMPUTER SCIENCE & ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer ***all*** the questions.   All questions carry equal marks

11x 2 = 22 M

1.

a) Define Nondeterministic Finite State Automaton.

b) Identify the language generated by the regular expression (1+0)* 00(0+1)*

c) Define Ambiguous and Unambiguous grammar.

d) What is the meaning of the transition $\boldsymbol{\delta(q_1,0,Z_0)=\{(q_1,0Z_0),(q_2, \varepsilon)\}}$

e) Give formal Notation of Turing Machine

f) Define NP class.

g) Define Universal Turing Machine.

h) Construct NFA with Є-transitions for the regular expression (1+01)*

i) Suppose h is the homomorphism from the alphabet {0,1,2} to the alphabet {a,b} defined by h(0)=a,h(1)=ab,h(2)=ba. What is h(21120)?

j) Consider the grammar G: S-->aaB , A-->bBb , B-->Aa . Check whether the string ***aabbabba*** belongs to L(G) or not?

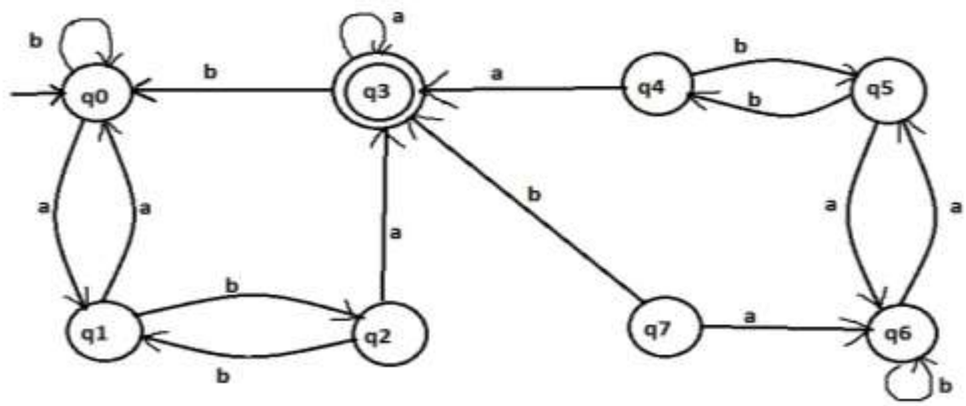
k) Mention any two operations of DCFL that are not closed.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Construct the minimum state Deterministic Finite Automaton for the following transition diagram 8 M



b) Construct Mealy machine for ∑={0,1,2}, print the residue modulo 5 of input treated as a ternary number. 8 M

3. a) Obtain the Minimized DFA equivalent to the regular expression: (00+11)*(01+10)(00+11)* 12 M

b) Define Pumping lemma for Regular sets. 4 M

4. a) Convert the following CFG into its equivalent Greibach Normal Form S--> AA | 0 , A-->SS | 1 8 M

b) Eliminate Useless symbols of the following grammar G

S-->AB | CA , A-->a , B--> BC| AB , C-->aB | b

8 M

5. a) Design a Turing Machine for the language
$L=\{ww^R \mid w \in (a+b)^*$ and w^R is the reverse of $w\}$ 8 M

b) Design a PDA to accept the language $L=\{w|w\in(a+b)^*$ and $n_a(w)=n_b(w)$. 8 M

6. a) Show that the Halting Problem of a Turing machine is Undecidable. 8 M

b) Define Post's Correspondence Problem. Obtain the solution for the following Post's correspondence problem A = {ba,abb,bab} B={bab,bb,abb}. 8 M