



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER VI [CE/IT]

SUBJECT: (CT614) THEORY OF AUTOMATA AND FORMAL LANGUAGES

Examination : Block Exam

Seat No. : _____

Date : 20/04/2016

Day : Wednesday

Time : 11.00 to 12.15

Max. Marks : 36

INSTRUCTIONS:

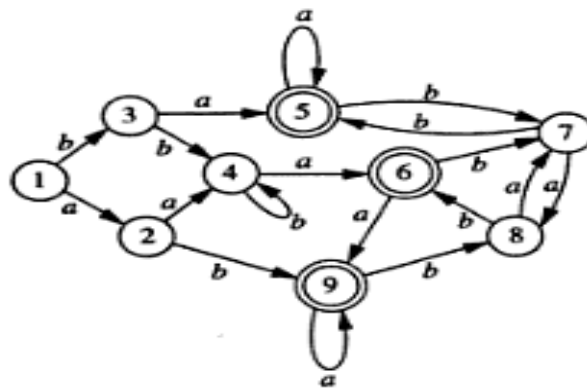
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

- (a) Define: Recursive Language & Recursively Enumerable Language. [2]
- (b) A relation on set $\{1, 2, 3\}$ is given. Of the three properties reflexivity, symmetry and transitivity, determine which ones the relation has. [2]
 - i) $R = \{(1,3), (3,1), (2,2)\}$
 - ii) $R = \Phi$
- (c) Give suitable example that If L_1 and L_2 are CFLs then $L_1 \cap L_2$ may be a CFL. [2]
- (d) Find strings which are **not** part of given regular expression [2]
 $01^* + 10^* + 1^*0 + (0^*1)^*$
- (e) Give a context-free grammar for given language [2]
The set of odd-length strings in $\{a, b\}^*$ whose first, middle and last symbol are all the same
- (f) Define pumping lemma for Regular Languages [2]

Q.2 Answer the following.

- (a) Minimize the Finite Automata given in below. [12]



- (b) Construct a Top-down PDA for $\{x \text{ belongs to } \{a,b\}^* \mid x \text{ is a palindrome}\}$ [6]

Q.3 (a) Construct a Deterministic finite automata for $(1+10+110)^*0$

[6]

- (b) Construct a Turing machine to Reverse a String.

[6]