DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH - Semester – VI(CE/IT)
SUBJECT: (CT 614) THEORY OF AUTOMATA & FORMAL LANGUAGE

Examination	**: 2nd Session**	**Seat No.**	**:**
Date	**: 15/02/2013**	**Day**	**:**
Time	**: 1. Hr. 15 Mins.**	**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 **[10]**

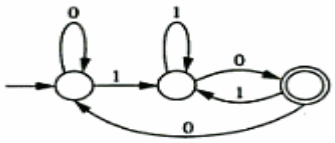
a. Define Pumping Lemma for regular language **2**

b. Disprove Statement with Counter example **2**
If L1 is regular, L2 is non-regular then L1UL2 is non-regular

c. Identify which of the following languages over {0,1} are regular **2**
i) Set of odd length strings with middle symbol '0'
ii) Set of all strings x containing some non-null substring of the form 'ww'

d. Show that the language $L = \{a^i b^j c^k \mid j > i + k\}$ cannot be written in the form $L = L1L2L3$, where $L1$, $L2$, and $L3$ are subsets of $\{a\}*$, $\{b\}*$,and $\{c\}*$, respectively. **2**

e Convert given Finite Automata into Chomsky Normal Form **2**



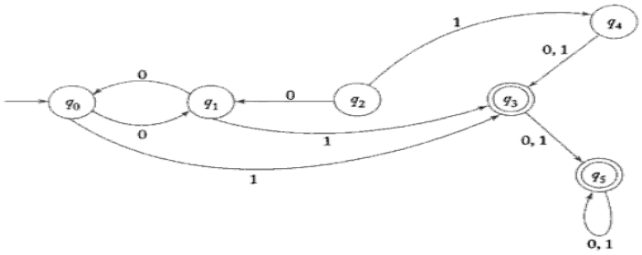
Q.2 Answer the Following (Any Three) **[12]**

a. Using pair wise distinguishable strings, show that language of Palindrome can't be accepted by Finite Automata

b. Generate a Context-Free Grammar for L= $\{ a^i b^j c^k \mid i<j+k\}$

c. Define Ambiguous grammar. Describe "Dangling Else" problem.

d. Minimize the Finite Automata



Q.3 Answer the Following **[14]**

a. State & prove Kleene's theorem Part-I for any two operations of regular language **8**

b. Convert the NFA-^ to NFA shown in Figure. **4**

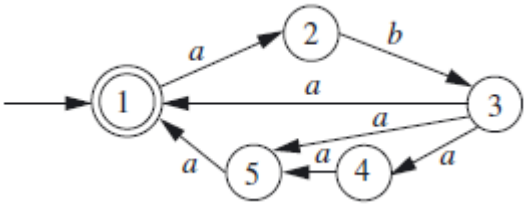
c. Let M=<Q,∑, q0, A, δ> be any NFA-^. Let M1=<Q,∑, q0, A1, δ1> be the equivalent NFA. Is it correct to define δ1(q,a)= δ*(q,a) for some q belongs to Q and a belongs to ∑* ? **2**

OR

Q.3 Answer the Following **[14]**

a. For any NFA M = (Q, ∑, qo, A, δ) accepting a language L subset of ∑*, there is a FA M1= (Q1, ∑, q1, A1, δ1) that also accepts L **8**

b. Convert Non-Deterministic Finite Automata (NDFA) to DFA shown in Figure. **4**



c. What is the relation if any, between Union of ^-closures and ^-closures of Union? Justify your answer with a suitable example. **2**