DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [Information Technology]
SUBJECT: (IT 511) Theory of Automata and Formal Language

Examination	**: Block- Regular**	**Seat No.**	**:**
Date	**: 20/10/2016**	**Day**	**:Thursday**
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. **[12]**

(a) Which of the following four regular expressions are equivalent? **[02]**
(1) (00)* (∧+0) (2) (00)* (3) 0* (4) 0(00)*
(a) 1 and 2 (b) 2 and 3 (c) 1 and 3 (d) 3 and 4

(b) Define Pumping Lemma for regular language **[02]**

(c) Write a context free grammar for declaring a variable in C language. **[02]**

(d) Is a Non Deterministic TM more powerful than Deterministic TM? Justify **[02]**

(e) Church's Thesis supports **[02]**
(A) A Turing machine as a general-purpose computer system
(B) A Turing machine an algorithm and an algorithm as a Turing machine
(C) Both TM is an general-purpose computer and TM is an algorithm and vice-versa are correct
(D) None of them is correct

(f) Write a context free grammar that generates the set of all palindromes over the alphabet {0; 1} **[02]**

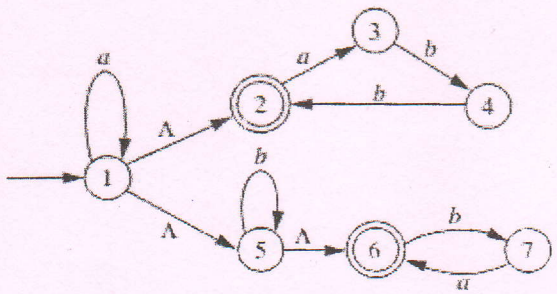
Q.2 **[12]**

(a) Draw a transition diagram for a TM with input alphabet {0,1}that interprets the input string as the binary representation of a nonnegative integer and adds 1 to it. **[06]**

(b) Construct NPDA for language { ww^r | w belongs to {a,b}*} **[06]**

Q.3 **[12]**

(a) Find the equivalent NFA of the following NFA-∧. **[06]**



(b) Consider the CFG G with productions **[06]**
S→ aB | bA | ∧ A→aS | bAA B→bS | aBB.
Find the PDA corresponding to above grammar and trace it for the string "aababb."