DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH - Semester – VI(CE/IT)
SUBJECT: (CT614)THEORY OF AUTOMATA AND FORMAL LANGUAGES

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.

Examination	**: 3rd Sessional**	**Seat No.**	**:**
Date	**: 12-04-2016**	**Day**	**: Tuesday**
Time	**: 12:30 P.M. TO 1:45 P.M.**	**Max. Marks**	**: 36**

Q.1 Answer the following: **[12]**

a) What do you mean by "Turing Machine recognizes Language L" ? [02]

b) State True/False and Justify: Non-Deterministic Turing Machine accepts more languages as compared to Deterministic Turing Machine. [02]

c) Define : Turing Machine Computing a Numerical Function [02]

d) Generate Context Sensitive Grammar for $\{a^n b^n c^n | \ n>=1\}$ [04]

e) Define: Pumping Lemma for CFG. [02]

Q.2 Answer the following: (***Any two)*** **[12]**

a) Construct Bottom-Up NPDA for given Context-Free Language [06]
L={x belongs to {a,b}*| $n_a(x)>n_b(x)$}

b) S→ T$ [06]
T→[T] T| ^
Construct **Top-Down Deterministic** PDA

c) Construct NPDA for {x belongs to {0,1}*| x is an odd length Palindrome} [06]

Q.3 Attempt the following: **[12]**

a) Construct Turing Machine for Language L={awa| w belongs to {a,b}*}. [03]

b) Construct Turing Machine for {x belongs to{a,b}*| x is a palindrome} [06]

c) Define: Encoding in Universal Turing Machine [03]

OR

Q.3 Attempt the following: **[12]**

a) Construct Turing Machine for (11+10)*0 [03]

b) Assume that natural number n is represented by string 1^n. Function F is from N→ N. [06]
Construct Turing Machine for $f(x)= x^2$

c) Write a short note on : Universal Turing Machine [03]