***PART B***

## Convert the given PDA to CFG. Given PDA

M = ({q0,q1},{0,1},{x,z0}, , q0,q0,  )

where  is given by

(q0 , o, z0 ) (q0 , xz0 )

(q0, o, x) (q0, xx)

(q0 ,1, x) (q1,)

(q1,1, x) (q1,)

(q1,, x) (q1,)

(q1,, z0 ) (q1,)

Construct a CFG G, generating N(M)

1. Design a Turing machine that accepts the language 0 n1n where n>0.
2. Construct a Turing Machine to perform Addition and Proper Subtraction
3. Prove the closure properties of recursive and recursively enumerable languages
4. Explain post correspondence problem and decidable and undecidable problem with example.

6. Prove that the following

i. L= {{an bn | n>0 } is not regular

ii. L={anbncn|| n>0 }is not a CFL

7. Explain the significance of universal Turing Machine

8. Prove that Lu is recursively enumerable and Lu is not recursive

9. Write and explain the Chomsky hierarchy of languages.

***PART A***

1. State the pumping lemma for Regular Languages.
2. Define Deterministic Push down Automata?
3. List out the different techniques for Turing Machine Construction.
4. What is a Turing machine? Give the specification of a Turing

Machine and explain.

1. Define instantaneous description of turing machine
2. Discuss about Multitape Turing Machines.
3. What are recursively enumerable languages and recursive sets?
4. What is universal Turing Machine?
5. Define the class NP problem.
6. Define Rice theorem.
7. How will you determine a PDA is deterministic
8. List out the different variations of Turing Machine
9. Define the class of languages accepted by Turing Machine