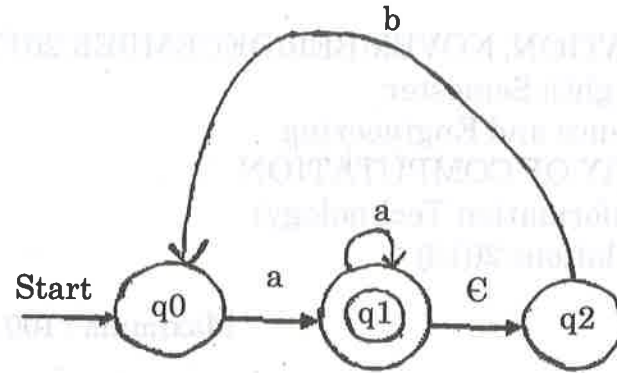




PART - B

(5×13=65 Marks)

11. a) Convert the ϵ -NFA to DFA and list the difference between NFA and DFA. (10+3)



(OR)

- b) Show that the regular language are closed under : (13)
- Union
 - Inter section
 - Kleen closure
 - Complement
 - Difference.
12. a) i) Construct a CFG to generate even and odd set of palindromes over alphabet {a, b}. (7)
- ii) Generate CFG for the language $L = \{0^i 1^j 0^k \mid j > i + k\}$. (6)
- (OR)
- b) i) Find an equivalent grammar in CNF for the grammar : (7)
- $$S \rightarrow bA/aB$$
- $$A \rightarrow bAA/aS/a$$
- $$B \rightarrow aBB/bS/b.$$
- ii) Eliminate the unit production of the following grammar : (6)
- $$S \rightarrow A/bb$$
- $$A \rightarrow B/b$$
- $$B \rightarrow S/a.$$



13. a) i) Find PDA that accept the given CFG : (7)
- $$S \rightarrow xaax$$
- $$X \rightarrow ax/bx/\epsilon.$$
- ii) Construct PDA for the language $a^n b^m a^{n+m}$. (6)
- (OR)
- b) i) Prove that deterministic and non deterministic PDA are not equivalent. (8)
- ii) Explain pumping Lemma for CFL. (5)
14. a) Construct Turing Machine (TM) that replace all occurrence of 111 by 101 from sequence of 0's and 1's. (13)
- (OR)
- b) i) Explain techniques for Turing Machine Construction. (7)
- ii) Illustrate the Chomsky grammar classification with necessary example. (6)
15. a) Explain universal Turing Machine. (13)
- (OR)
- b) Explain how to measure and classify complexity. (13)

PART - C

(1×15=15 Marks)

16. a) Prove that Halting problem is undecidable. (15)
- (OR)
- b) Consider two-tape Turing machine (TM) and determine whether the TM always writes a nonblank symbol on its second tape during the computation on any input string 'w'. Formulate this problem as a language and show it is undecidable. (15)