VIJAYA DEGREE COLLEGE
VI SEM BCA
Model Question paper-1
Computer Science

BCA 601: THEORY OF COMPUTATION

TIME: 3 hrs **MARKS: 100**

INSTRUCTION : ANSWER ALL SECTIONS

SECTION-A

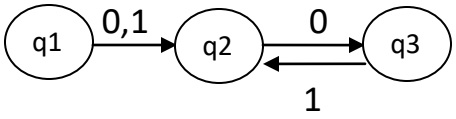
Answer any TEN questions .Each question carries TWO marks 10X2=20

1. Define DFA with mathematical representation.
2. Define alphabet and symbol with a suitable example.
3. What is a trap state.
4. Define regular expression.
5. Design a regular expression for the language containing any number of a's and b's ending with aa.
6. State pumping lemma for regular languages.
7. Mention the different types of Chomsky hierarchy grammar.
8. Define PDA.
9. Define GNF.
10. Define Turing Machine .
11. Define PCP.
12. State Arden's Theorem

SECTION-B

Answer any FIVE questions. Each question carries FIVE marks 5X10=50

13. Construct a DFA to accept strings of 0's and 1's ending with 101
14. Differentiate between DFA and NFA.
15. Convert the DFA to the Regular expression



16. State and prove the pumping lemma for CFLs.
17. Obtain a CFG for the following language $L=\{a^nb^n|n>=1\}$
18. Explain the Halting problem of Turing Machine.
19. Rewrite the grammar after eliminating the unit productions from the given grammar

S->AB
A->0
B->1
C->D
D->E|011A
E->1

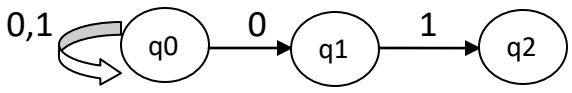
20. Show that the following grammar is ambiguous

E->E+E|E-E|E*E|{E}|id

SECTION-C

Answer any THREE questions. Each question carries FIFTEEN marks 3*15=45

21. Convert the following NFA to DFA



22. Minimize the given DFA using table filling algorithm

$	0	1
A	B	D
B	C	E
C	B	E
D	C	E
E	E	E

23. Construct a PDA to accept the language

L(M)={WW^r|w€(a+b)*} where w^r is reverse of w by final state acceptance.

24. Find the language accepted by CFG

(a) G={V,T,P,S}

V={S}

T={a,b}

S={S}

P={S->aS|b}

(b) Obtain a grammar to generate a string having atleast one b over{a,b}

(c) Obtain a CFG for the language

L(M)={WcW^r|w€(a,b)*} where w^r is reverse of w

25. Obtain a turing machine to accept the language

L(M)={a^nb^n|n>=1}

SECTION-D

Answer any ONE question. Each question carries TEN marks 1*10=10

26. Construct the NFA with Ɛ-moves for (0+1)*1(0+1)
27. Explain the different types of Turing Machine.