Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

Fourth Semester

Computer Science and Engineering

UCST24403 / CS3452 - THEORY OF COMPUTATION

(Common to Information Technology)

Regulations – 2024 & 2021

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Define DFA.	L1	1	2
2.	Give the non-deterministic automata to accept strings containing the substring 0101.	L2	1	2
3.	What are the closure properties of regular languages?	L2	2	2
4.	Illustrate a regular expression for the set of all the strings.	L1	2	2
5.	Define parse tree and derivation.	L1	3	2
6.	Examine the context free Grammar representing the set of Palindrome over (0+1)*.	L2	3	2
7.	Define Turing Machine.	L1	4	2
8.	State Pumping lemma for CFL.	L2	4	2
9.	Define NP hard and NP completeness problem.	L1	5	2
10.	Describe post correspondence problem.	L2	5	2

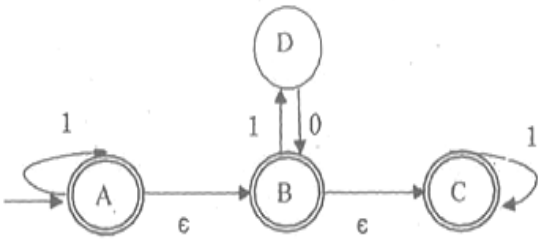
*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No		*Questions*	*BLT*	*CO*	*Marks*
11.	a i	Classify how a language L is accepted by some DFA if L is accepted by some NFA.	L3	1	8
	ii	Convert the following NFA to its equivalent DFA.	L3	1	8

	0	1
p	{p,q}	{p}
q	{r}	{r}
r	{s}	ϕ
*s	{s}	{s}

Or

	b	Convert the following ε-NFA to NFA and then convert the resultant NFA to DFA	L3	1	16



12.	a	Demonstrate how the set L= {abn/n>=1} is not a regular.	L4	2	16
		Or			
	b	Point out about the regular expression and regular Language.	L4	2	16
13.	a i	Discuss about PDA and CFL Prove the equivalence of PDA and CFL.	L2	3	8
	ii	If L is Context free language then prove that there exists PDA M such that L=N(M).	L2	3	8
		Or			
	b i	Define PDA. Give an Example for a language accepted by PDA by empty stack.	L2	3	8
	ii	Convert the grammar S ->0S1|A , A ->1A0|S| ε into PDA that accepts the same language by the empty stack Check whether 0101 belongs to N(M).	L2	3	8
14.	a	Convert the following grammar G into Greibach Normal Form (GNF): S → XA|BB B → b|SB X → b A → a	L3	4	16
		Or			
	b i	Examine the role of checking off symbols in a Turing Machine.	L3	4	8
	ii	Describe a Turing Machine M to implement the function "multiplication" using the subroutine copy.	L3	4	8
15.	a	Consider and find the languages obtained from the following operations: (a) Union of two recursive languages. (b) Union of two recursively enumerable languages. (c) L if L and complement of L are recursively enumerable.	L2	5	16
		Or			
	b	Discuss post correspondence problem.Let ∑={0,1}.Let A and B be the lists of three strings each ,defined as	L2	5	16

	List A	List B
i	wi	xi
1	1	111
2	10111	10
3	10	0

(i) Does the PCP have a solution?
(ii) Prove that the universal language is recursively enumerable.