



Group - A (Short Answer Questions)

S. No.	Questions	Blooms Taxonomy Level	Course Outcomes
UNIT - I			
1.	Explain transition diagram, transition table with example.	Understand	1
2.	Define transition function of DFA.	Remember	2
3.	Define ϵ -transitions.	Remember	2
4.	Construct a DFA to accept even number of 0's.	Apply	2
5.	Define Kleen closure.	Remember	1
6.	Construct a DFA to accept empty language.	Apply	2
7.	Explain power of an alphabet?	Understand	1
8.	Write transition diagram for DFA accepting string ending with 00.	Apply	2
9.	Write transition diagram for DFA to accept exactly one a.	Apply	2
10.	Define the language of NFA.	Remember	2
UNIT – II			
1.	Define Regular Languages.	Remember	7
2.	Define Pumping Lemma.	Remember	7
3.	Write the applications of pumping lemma for regular languages.	Apply	7
4.	List any two applications of regular expression.	Remember	7
5.	Define Context Free Grammars.	Remember	8
6.	Write through an intermediate state whose number is not greater than K-1.	Apply	7
7.	Write regular expression for denoting language containing empty string.	Apply	7
8.	Differentiate LMD and RMD.	Understand	8
9.	Define ambiguous grammar.	Remember	8

S. No.	Questions	Blooms Taxonomy Level	Course Outcomes
10.	State the following grammar is ambiguous. $S \rightarrow AB aaB$ $A \rightarrow a / Aa$ $B \rightarrow b$	Remember	8
UNIT – III			
1.	Define Greibach normal form.	Remember	9
2.	Define nullable Variable.	Remember	8
3.	State the nullable variables from the following CFG. $S \rightarrow ABCa bD$ $A \rightarrow BC b$ $B \rightarrow b \epsilon$ $C \rightarrow D \epsilon$ $D \rightarrow d$	Remember	9
4.	State the symbol is used to label the interior node of the parse tree.	Remember	8
5.	Define the language of PDA accepted by final state.	Remember	10
6.	List the steps to convert CFG to PDA.	Remember	11
7.	Define CNF.	Remember	9
8.	Define PDA.	Remember	10
9.	Define NPDA.	Remember	10
10.	Differentiate between deterministic and nondeterministic PDA.	Understand	10
UNIT - IV			
1.	Write the Turing Machine model.	Apply	12
2.	Explain the moves in Turing Machine	Understand	12
3.	Define an ID of a Turing Machine?	Remember	12
4.	Define the Language of Turing Machine.	Remember	12
5.	List types of TM	Remember	12
6.	Define Turing Machine.	Remember	12
7.	Write the difference between Pushdown Automata and Turing Machine.	Apply	12
8.	Explain Church's Hypothesis.	Understand	12
9.	Define Context sensitive language.	Remember	12
10.	Define multi head Turing Machine, multi dimensional Turing Machine.	Remember	12
UNIT - V			
1.	Define Chomsky hierarchy of languages.	Remember	4
2.	Define Universal Turing Machine	Remember	12
3.	Define LR(0) grammars.	Remember	5
4.	Define decidability & undecidability	Remember	13
5.	Define P, NP problems.	Remember	13
6.	Define Rice's theorem	Remember	13
7.	Give examples for Undecidable Problems	Understand	13
8.	Define Turing Machine halting problem.	Remember	13
9.	Define Turing Reducibility	Remember	13
10.	Define PCP.	Remember	13

2. Group - II (Long Answer Questions)

S. No.	Questions	Blooms Taxonomy Level	Course Outcomes
10 Marks Questions			
UNIT - I			
1.	Define language over an alphabet with examples. Write a DFA to accept set of all strings ending with 010.	Remember	2
2.	Give example for Minimize the DFA .	Understand	2
3.	Construct a Moore machine to accept the following language. $L = \{ w \mid w \bmod 3 = 0 \}$ on $\Sigma = \{ 0,1,2 \}$	Apply	3
4.	Write any four differences between DFA and NFA	Apply	2
5.	Convert NFA with ϵ to NFA with an example.	Understand	2
6.	Construct NFA for $(0 + 1)^*(00 + 11)(0 + 1)^*$ and Convert to DFA.	Apply	2

S. No.	Questions	Blooms Taxonomy Level	Course Outcomes
7.	Construct NFA for $(0+1)^*(00+11)(0+1)^*$ and Draw the transition table and transition diagram and example strings.	Apply	2
8.	Illustrate given 2 FA's are equivalent or not with an example.	Apply	6
9.	Construct Mealy machine for $(0+1)^*(00+11)$ and convert to Moore machine.	Apply	3
10.	Convert Moore machine to Mealy machine with an example.	Understand	3
UNIT - II			
1.	Convert Regular Expression $01^* + 1$ to Finite Automata.	Understand	e
2.	Convert given Finite Automata to Regular Expression using Arden's theorem.	Understand	7
3.	Convert given Finite Automata to Regular Expression using standard method (R_{ij}^k method)	Understand	7
4.	Explain Identity rules. Give an example using the identity rules for the simplification.	Understand	7
5.	Construct Regular grammar for the given Finite Automata.	Apply	7
6.	Use G be the grammar $S \rightarrow aB \mid bA$ $A \rightarrow a \mid aS \mid bAA$ $B \rightarrow b \mid bS \mid aBB$ For the string aaabbabbba , Find a. Leftmost Derivation. b. Rightmost Derivation. c. Derivation Tree.	Apply	8
7.	Explain the properties, applications of Context Free Languages	Understand	8
8.	Construct right linear and left linear grammars for given Regular Expression.	Apply	7
9.	Construct a Transition System M accepting $L(G)$ for a given Regular Grammar G.	Apply	7
10.	Discuss the properties of Context free Language. Explain the pumping lemma with an example.	Understand	7
UNIT - III			
1.	Write a short notes on Chomsky Normal Form and Griebach Normal Form.	Apply	9
2.	Show that the following grammar is ambiguous with respect to the string aaabbabbba. $S \rightarrow aB \mid bA$ $A \rightarrow aS \mid bAA \mid a$ $B \rightarrow bS \mid aBB \mid b$	Understand	8
3.	Use the following grammar : $S \rightarrow ABC \mid BbB$ $A \rightarrow aA \mid BaC \mid aaa$ $B \rightarrow bBb \mid a \mid D$ $C \rightarrow CA \mid AC$ $D \rightarrow \phi$ Eliminate ϵ -productions. Eliminate any unit productions in the resulting grammar. Eliminate any useless symbols in the resulting grammar. Convert the resulting grammar into Chomsky Normal Form	Apply	9
4.	Illustrate the construction of Griebach normal form with an example.	Apply	9
5.	Show that the following CFG ambiguous. $S \rightarrow iCtS \mid iCtSeS \mid a$ $C \rightarrow b$	Apply	8
6.	Discuss the Pumping lemma for Context Free Languages concept with example $\{a^n b^n c^n \mid n > 0\}$	Understand	9
7.	Write the procedure to convert CFG to PDA and also convert the following CFG to PDA. $S \rightarrow B \mid aAA$ $A \rightarrow aBB \mid a$ $B \rightarrow bBB \mid A$ $C \rightarrow a$	Apply	11

S. No.	Questions	Blooms Taxonomy Level	Course Outcomes												
8.	Construct a PDA to accept the language $L = \{ a^n b^n \mid n \geq 1 \}$ by a final state. Draw the graphical representation of the PDA. Also show the moves made by the PDA for the string aaabbb	Apply	10												
9.	Construct NPDA for $L = \{ W W^R / W \in (0 + 1)^* \}$ $M = (\{q_1, q_2\}, \{0, 1\}, \{R, B, G\}, \delta, q_1, R, \phi)$	Apply	10												
10.	Write the procedure to convert from the given PDA to a CFG. Convert the following example. $\delta(q_0, b, z_0) = \{q_0, zz_0\}$ $\delta(q_0, b, z) = \{q_0, zz\}$ $\delta(q_0, \epsilon, z_0) = \{q_0, \epsilon\}$ $\delta(q_0, a, z) = \{q_1, z\}$ $\delta(q_1, b, z) = \{q_1, \epsilon\}$ $\delta(q_1, a, z_0) = \{q_0, z_0\}$	Apply	11												
UNIT – IV															
1.	Define a Turing Machine. With a neat diagram explain the working of a Turing Machine.	Remember	12												
2.	Construct a Turing Machine which shift non block symbols 3 cells to the right.	Apply	12												
3.	Construct a Turing Machine to accept the following language. $L = \{ 0^n 1^n 0^n \mid n \geq 1 \}$	Apply	12												
4.	Construct a Turing Machine that accepts the language $L = \{ 0^n 1^n \mid n \geq 1 \}$. Give the transition diagram for the Turing Machine obtained and also show the moves made by the Turing machine for the string 000111.	Apply	12												
5.	Construct a Turing Machine to accept the language $L = \{ w \# w^R \mid w \in (a + b)^* \}$	Apply	12												
6.	Write short notes on Recursive and Recursively Enumerable languages?	Apply	12												
7.	Write the properties of recursive and recursively enumerable languages	Apply	12												
8.	Construct a Turing Machine to accept strings formed with 0 and 1 and having substring 000.	Apply	12												
9.	Construct a Turing Machine that accepts the language $L = \{ 1^n 2^n 3^n \mid n \geq 1 \}$. Give the transition diagram for the Turing Machine obtained and also show the moves made by the Turing machine for the string 111222333.	Apply	12												
10.	Construct a Turing Machine to implement Subtraction (m-n).	Apply	12												
UNIT – V															
1.	Explain the concept of undecidability problems about Turing Machine	Understand	12												
2.	Write a note on Modified PCP and Multi tape Turing machine.	Apply	13												
3.	Explain individually classes P and NP	Understand	13												
4.	Write a shot notes on post's correspondence problem and check the following is PCP or not. <table><tr><td>I</td><td>A</td><td>B</td></tr><tr><td>1</td><td>11</td><td>111</td></tr><tr><td>2</td><td>100</td><td>001</td></tr><tr><td>3</td><td>111</td><td>11</td></tr></table>	I	A	B	1	11	111	2	100	001	3	111	11	Apply	13
I	A	B													
1	11	111													
2	100	001													
3	111	11													
5.	Explain the Halting problem and Turing Reducibility.	Understand	13												
6.	Write a short notes on universal Turing machine	Apply	12												
7.	Write a short notes on Chomsky hierarchy.	Apply	4												
8.	Write a short notes on Context sensitive language and linear bounded automata.	Apply	4												
9.	Write a short notes on NP complete , NP hard problems.	Apply	13												
10.	Define LR(0) items. Find LR(0) for the following example. $S' \rightarrow Sc$ $S \rightarrow SA / A$ $A \rightarrow aSb/ab$	Remember	5												

3. Group - III (Analytical Questions)

S. No.	Questions	Blooms Taxonomy Level	Course Outcomes
PROBLEM SOLVING/ANALYTICAL/CRITICAL THINKING QUESTIONS			
UNIT - I			
1	Construct NFA for $(0 + 1)^*0(0 + 1)0(0 + 1)^*$ and convert to DFA.	Apply	2
2	Construct NFA for $(0 + 1)^*010(0 + 1)^*$ and Convert to DFA.	Apply	2
3	Construct NFA with ϵ for $0^*1^*2^*$ and Convert to NFA .	Apply	2
4	Explain the steps for the minimization of given DFA with an example.	Understand	2
5	Construct Mealy Machine for Residue Modulo of 5 for the ternary number system and convert to Moore Machines.	Apply	2
UNIT - II			
1	Convert Regular Expression $(11 + 0)^*(00 + 1)^*$ to NFA with ϵ .	Understand	7
2	Convert Regular Expression $(a + b)^*(aa + bb)(a + b)^*$ to DFA.	Understand	7
3	Construct Regular Grammars for Finite Automata $0^*(1(0 + 1))^*$.	Apply	7
4	Construct Finite Automata for $A0 \rightarrow a A1$ $A1 \rightarrow b A1$ $A1 \rightarrow a$ $A1 \rightarrow bA0$	Apply	7
UNIT - III			
1	Construct PDA for equal number of x's and y's	Apply	10
2	Convert the following grammar into GNF $A1 \rightarrow A2 A3$ $A2 \rightarrow A3 A1 / b$ $A3 \rightarrow A1 A2 / a$	Understand	9
3	Construct NPDA for $L = \{ W W^R / W \in (X + Y)^* \}$ $M = (\{q1, q2\}, \{x, y\}, \{R, B, G\}, \delta, q1, R, \phi)$	Apply	10
4	Convert the following PDA to CFG $\delta(q0, 0, z0) = \{q0, xz0\}$ $\delta(q0, 0, x) = \{q0, xx\}$ $\delta(q0, 1, x) = \{q1, \epsilon\}$ $\delta(q1, 1, x) = \{q1, \epsilon\}$ $\delta(q1, \epsilon, x) = \{q1, \epsilon\}$ $\delta(q1, \epsilon, z0) = \{q1, \epsilon\}$	Understand	11
UNIT - IV			
1	Construct a Turing Machine that accepts the language $L = \{a^{2n}b^n \mid n \geq 0\}$. Give the transition diagram for the Turing Machine obtained.	Apply	12
2	Construct a Turing Machine that gives two's complement for the given binary representation.	Apply	12
3	Construct a Turing Machine to accept the following language. $L = \{ w^n x^n y^n z^n \mid n \geq 1 \}$	Apply	12
4	Construct a Turing Machine which shift non block symbols 2 cells to the right.	Apply	12
UNIT - V			
1	Explain PCP and MPCP with examples.	Understand	13
2	Explain Turing theorem ,Halting problems, Turing Reducibility.	Understand	13
3	Construct LR(0) for $S \rightarrow E$ $E \rightarrow E^*B$ $E \rightarrow E + B$ $E \rightarrow id$	Apply	5
4	Construct LR(0) for $A \rightarrow aAa/B$ $B \rightarrow b$	Apply	5