Theory of Computation

One-mark questions (20 - MCQS)

1. Which type of automaton recognizes regular languages?

a) DFA

b) NFA

c) PDA

d) TM

2. What is the language accepted by a finite state machine with a single final state?

a) All possible strings

b) No string

c) Only the empty string

d) All strings except the empty string

3. Which of the following is a regular language?

a) {0^n 1^n | n ≥ 0}

b) {0^n | n ≥ 0}

c) {1^n 0^n | n ≥ 0}

d) {1^n | n ≥ 0}

4. What is the complement of the language {a, b}?

a) {ε}

b) {a, b}

c) {ε, a, b}

d) ∅

5. Which of the following is a context-free language?

a) {a^n b^n | n ≥ 0}

b) {a^n b^2n | n ≥ 0}

c) {a^n b^3n | n ≥ 0}

d) {a^n b^m | n, m ≥ 0}

6. What is the closure property of regular languages under union?

a) The union of two regular languages is always regular

b) The union of two regular languages is never regular

c) The union of two regular languages may or may not be regular

d) The union of two regular languages is only regular if they are identical

7. Which of the following is a decidable problem?

a) Halting problem

b) Membership problem

c) Validity problem

d) Satisfiability problem

8. What is the language accepted by a pushdown automaton with a single final state?

a) All possible strings

b) No string

c) Only the empty string

d) All strings except the empty string

9. Which type of automaton recognizes context-free languages?

a) DFA b) NFA c) PDA d) TM

10. What is the pumping lemma used for in TOC?

a) To prove a language is regular

b) To prove a language is context-free

c) To prove a language is non-regular

d) To prove a language is non-context-free

11. Which of the following is a non-context-free language?

a) {a^n b^n | n ≥ 0} b) {a^n b^2n | n ≥ 0} c) {a^n b^3n | n ≥ 0} d) {a^n b^m | n, m ≥ 0}

12. What is the language accepted by a Turing machine with a single final state?

a) All possible strings b) No string

c) Only the empty string d) All strings except the empty string

13. Which type of automaton recognizes recursively enumerable languages?

a) DFA b) NFA c) PDA d) TM

14. What is the halting problem in TOC?

a) Whether a machine accepts a string

b) Whether a machine halts on a string

c) Whether a machine rejects a string

d) Whether a machine loops on a string

15. Which of the following is a regular expression?

a) (a|b)* b) (a|b)+ c) (a|b)? d) (a|b)^n

16. What is the language accepted by a finite state machine with no final states?

a) All possible strings b) No string

c) Only the empty string d) All strings except the empty string

17. Which of the following is a context-free grammar?

a) S → aS | ε b) S → aS | b c) S → aS | bS d) S → aS | b|ε

18. What is the closure property of regular languages under intersection?

a) The intersection of two regular languages is always regular

b) The intersection of two regular languages is never regular

c) The intersection of two regular languages may or may not be regular

d) The intersection of two regular languages is only regular if they are identical

19. Which of the following is a decidable problem?

a) Halting problem

b) Membership problem

c) Validity problem

d) Satisfiability problem

20. What is the language accepted by a pushdown automaton with no final states?

a) All possible strings

b) No string

c) Only the empty string

d) All strings except the empty string

Two-mark questions (10 - MCQS)

1. What is the difference between a DFA and an NFA?

a) DFA is non-deterministic, NFA is deterministic

b) DFA is deterministic, NFA is non-deterministic

c) DFA accepts regular languages, NFA accepts context-free languages

d) DFA accepts context-free languages, NFA accepts regular languages

2. What are the two types of finite automata?

A) DFA and NFA B) DFA and PDA

C) NFA and PDA D) PDA and TM

3. What is the pumping lemma used for in TOC?

a) To prove a language is regular b) To prove a language is context-free

c) To prove a language is non-regular d) To prove a language is non-context-free

4. What is the halting problem in TOC?

a) Whether a machine accepts a string b) Whether a machine halts on a string

c) Whether a machine rejects a string d) Whether a machine loops on a string

5. Which of the following is a regular expression?

a) (a|b)* b) (a|b)+ c) (a|b)? d) (a|b)^n

6. What is the language accepted by a finite state machine with no final states?

a) All possible strings b) No string

c) Only the empty string d) All strings except the empty string

7. Which type of automaton recognizes recursively enumerable languages?

a) DFA b) NFA c) PDA d) TM

8. What is the difference between a context-free grammar and a regular grammar?

a) Context-free grammar generates regular languages, regular grammar generates context-free languages

b) Context-free grammar generates context-free languages, regular grammar generates regular languages

c) Context-free grammar generates recursively enumerable languages, regular grammar generates regular languages

d) Context-free grammar generates regular languages, regular grammar generates recursively enumerable languages

9. Which of the following is a decidable problem?

a) Halting problem b) Membership problem

c) Validity problem d) Satisfiability problem

10. What is the closure property of regular languages under complementation?

a) The complement of a regular language is always regular

b) The complement of a regular language is never regular

c) The complement of a regular language may or may not be regular

d) The complement of a regular language is only regular if it is identical

One-mark questions (5 - MSQs)

1. Which of the following are true about Turing Machines?

A) They are single-tape machines

B) They are multi-tape machines

C) They are equivalent to Pushdown Automata

D) They are less powerful than Pushdown Automata

2. What is the language accepted by a finite state machine with a single final state?

a) All possible strings b) No string

c) Only the empty string d) All strings except the empty string

3. Which of the following is a regular language?

a) {0^n 1^n | n ≥ 0} b) {0^n | n ≥ 0}

c) {1^n 0^n | n ≥ 0} d) {1^n | n ≥ 0}

4. What is the complement of the language {a, b}?

a) {ε} b) {a, b} c) {ε, a, b} d) Ø

5. Which of the following is a decidable problem?

a) Halting problem b) Membership problem

c) Validity problem d) Satisfiability problem

Two-mark questions (5 - MSQs)

1. What is the difference between a DFA and an NFA?

a) DFA is non-deterministic, NFA is deterministic

b) DFA is deterministic, NFA is non-deterministic

c) DFA accepts regular languages, NFA accepts context-free languages

d) DFA accepts context-free languages, NFA accepts regular languages

2. Which of the following are closure properties of regular languages?

A) Union and intersection B) Union and complementation

C) Intersection and complementation D) Union, intersection, and complementation

3. What is the pumping lemma used for in TOC?

a) To prove a language is regular b) To prove a language is context-free

c) To prove a language is non-regular d) To prove a language is non-context-free

4. What is the halting problem in TOC?

a) Whether a machine accepts a string b) Whether a machine halts on a string

c) Whether a machine rejects a string d) Whether a machine loops on a string

5. Which of the following statements are true about regular languages?

A) Regular languages are closed under union and intersection.

B) Regular languages are closed under complementation.

C) Regular languages are closed under concatenation.

D) Regular languages are not closed under complementation.

One-mark questions (5 - NAT)

1. What is the minimum number of states required in a DFA to recognize the language {a, b}?

Answer: ___ 2

2. What is the maximum number of transitions possible in an NFA with 3 states and 2 inputs?

Answer: ___ 6

3. What is the minimum number of states required in a PDA to recognize the language {0^n 1^n | n ≥ 0}?

Answer: ___ 2

4. What is the maximum number of productions possible in a context-free grammar with 2 variables and 2 terminals?

Answer: ___ 8

5. What is the minimum number of tapes required in a TM to recognize the language {a, b}?

Answer: ___ 1

Two-mark questions (5 - NAT)

1. What is the minimum number of states required in a DFA to recognize the language {a^n b^n | n ≥ 0}?

Answer: ___ 3

2. What is the maximum number of transitions possible in an NFA with 4 states and 3 inputs?

Answer: ___ 12

3. What is the minimum number of states required in a PDA to recognize the language {0^n 1^2n | n ≥ 0}?

Answer: ___ 2

4. What is the maximum number of productions possible in a context-free grammar with 3 variables and 3 terminals?

Answer: ___ 27

5. What is the minimum number of tapes required in a TM to recognize the language {a^n b^2n | n ≥ 0}?

Answer: ___ 1

UNIT I										
S.No	Question	Image	Option	Option	Option	Option	Correct	Mark	Type	Topic
1	Which of the following is a correct definition of a regular language?		Any language that can be recognized by a Turing machine	Any language that can be expressed using a regular expression.	Any language that contains only finite strings.	Any language that contains an infinite number of strings.	Any language that can be expressed using a regular expression.	1	MCQ	Regular Language
2	In a regular expression, what does the symbol `*` typically represent?		Matches exactly one occurrence of the preceding character.	Matches zero or more occurrences of the preceding character.	Matches one or more occurrences of the preceding character.	Matches the end of a string.	Matches zero or more occurrences of the preceding character.	1	MCQ	RE
3	Which of the following is not a valid component of a DFA (Deterministic Finite Automaton)?		Alphabet	Transitions	Stack	States	Stack	1	MCQ	DFA
4	What is the purpose of the transition function in a DFA?		To define how the automaton moves between states based on input symbols.	To define the initial state of the automaton.	To define the set of accepting states.	To define the input alphabet.	To define how the automaton moves between states based on input symbols.	1	MCQ	DFA

5	Which of the following is a correct statement about NFAs (Nondeterministic Finite Automata)?		NFAs are always smaller than DFAs.	NFAs cannot recognize regular languages.	NFAs can have multiple possible next states for a given input symbol and current state.	NFAs do not require initial states.	NFAs can have multiple possible next states for a given input symbol and current state.	1	MCQ	NFA
6	Which of the following is used to convert a regular expression into an equivalent NFA (Nondeterministic Finite Automaton)?		Thompson's construction	Subset construction	Lexical analysis	Parsing	Thompson's construction	1	MCQ	NFA
7	The lexical analysis phase in a compiler is responsible for:		Checking syntax errors in the code.	Optimizing intermediate code generation.	Converting source code into a sequence of tokens.	Debugging the compiled output.	Converting source code into a sequence of tokens.	1	MCQ	lexical analysis
8	Which of the following tools is commonly used to generate lexical analyzers based on regular expressions?		Yacc	Bison	Flex	JavaCC	Flex	1	MCQ	lexical analysis
9	What is the primary difference between a DFA and an NFA?		DFAs use a stack, while NFAs do not.	DFAs can recognize more languages than NFAs.	DFAs have a single unique transition for each state and input symbol, whereas NFAs can have	DFAs require more memory than NFAs.	DFAs have a single unique transition for each state and input symbol, where	1	MCQ	DFA,NFA

					multiple transitions.		as NFAs can have multiple transitions.			
10	Which of the following is not a feature of regular expressions?		Grouping using parentheses	Alternation using the '|' symbol	Recursive definitions	Quantifiers like '*' and '+'	Recursive definitions	1	MCQ	RE
11	Which operation on regular languages is not closed?		Union	Intersection	Concatenation	Complementation	Intersection	1	MCQ	RL
12	Which of the following is a correct conversion process from a regular expression to an NFA?		Direct substitution of symbols	Constructing an NFA that simulates the regular expression's behavior	Cpnverting the regular expression to a DFA first	Using pushdown automata as an intermediate step	Constructing an NFA that simulates the regular expression's behavior	1	MCQ	RE
13	What is the minimum number of states required in a DFA that accepts all strings over {0, 1} that do not end with '00'?		1	2	3	4	2	1	MCQ	DFA
14	Lexical analysis is the process of:		Interpreting the meaning of individual words in a sentence	Analyzing the structure of sentences in a language	Converting source code into tokens for further processing	Optimizing code for faster execution	Converting source code into tokens for further processing	1	MCQ	lexical analysis
15	The pumping lemma for regular languages is used to:		Prove that every regular	Prove that certain language	Generate RE from DFA's	Simplify the constru	Prove that certain	1	MCQ	pumping lemma

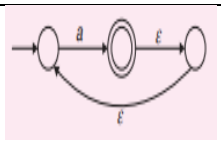
			languag e has an equivale nt DFA.	s are not regular.		ction of NFA's	langu ages are not regula r.			
16	What is the relationship between NFAs and DFAs?		Every DFA is also a NFA	Every NFA is also a DFA	DFA's and NFA's recogni se the same set of languag es	NFA's are more powerf ul than DFA's	DFA' s and NFA' s recog nise the same set of langu ages	1	MC Q	NFA,DF A
17	A regular expression for the language of all strings over {0, 1} that contain at least two 0s is:		01	010*	(01)*	011*	010*	1	MC Q	RE
18	The empty language can be recognized by:		A DFA with one non-acceptin g state	A DFA with one acceptin g state	An NFA with one non-accepti ng state	An NFA with non-accepti ng state	A DFA with one non-accept ing state	1	MC Q	language
19	Which of the following is a valid regular expression for all strings over {0, 1} that end with '11'?		(01)*	0111	0111*	(0|1)	0111	1	MC Q	RE
20	What is the purpose of the transition function in a finite automaton?		To specify the start state of the automat a	To define the set of acceptin g states	To determi ne the output of each input symbol	To specify the next state giventh e current state and input symbol	To specif y the next state givent he curren t state and input symb ol	1	MC Q	FA
21	Which of the following is a limitation of regular		They cannot recogni ze	They cannot recogniz e	They cannot handle strings	They cannot recogni ze	They canno t recog	1	MC Q	RL

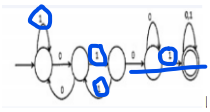
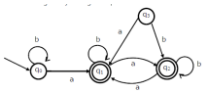
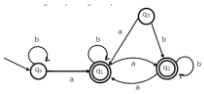
	languages?		nested structures	language with infinite alphabets	longer than a predefined length	language containing both 0s and 1s	nize nested structures			
22	Which of the following is NOT a valid regular expression?		(a|b)*	ab	(abc*)+	a(b|c)*	(abc*)+	1	MCQ	RE
23	Which of the following is a correct statement about DFAs and NFAs?		Any NFA can be converted into a DFA without changing number of states	Every regular language has a unique NFA that recognizes it.	DFAs can recognize more languages than NFAs	NFA s are always faster in recognizing regular languages than DFAs	Every regular language has a unique NFA that recognizes it.	1	MCQ	DFA,NFA
24	What is the pumping lemma for regular languages used to prove?		Every regular languages has an equivalent DFA	There exist language that are not regular.	Regular languages are always finite.	Every regular language can be generated by a regular expression	There exist language that are not regular.	1	MCQ	pumping lemma
25	Which of the following statements about NFAs is true?		They can be multiple transitions on the same input symbol from a state	They always require more memory than DFAs for the same language	They are equivalent toTuring machines in computational power	They cannot be simulated by a DFA	They can be multiple transitions on the same input symbol from a state	1	MCQ	NFA
26	Select all correct statements about DFAs (Deterministic Finite Automata).		DFAs can have epsilon transitions.	DFAs are a type of finite automaton.	DFAs can recognize all regular languages.	DFAs have exactly one unique next state for each	DFAs are a type of finite automaton, DFAs have	2	MSQ	DFA

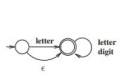
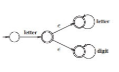
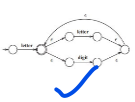
						state and input symbol.	exactly one unique next state for each state and input symbol.			
27	Which of the following are valid components of a regular expression?		Literal characters	Meta characters	Parentheses for grouping	Square brackets for character classes	Literal characters, Meta characters, Parentheses for grouping, Square brackets for character classes	2	MSQ	RE
28	When converting an NFA to a DFA, which of the following statements are true?		The DFA may have fewer states than the original NFA.	The DFA may have more states than the original NFA.	The DFA always has the same number of states as the original NFA.	The DFA can recognize a different language than the original NFA.	The DFA may have fewer states than the original NFA., The DFA may have more states than the original	2	MSQ	DFA,NFA

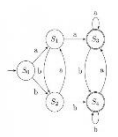
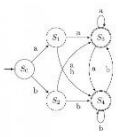
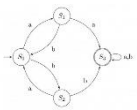
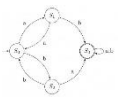
							NFA.			
29	Select all applications where finite automata are commonly used:		Lexical analysis in compilers ✓	Natural language processing	Pattern matching in text processing ✓	Network security protocols	Lexical analysis in compilers, Pattern matching in text processing	2	MSQ	Application of FA
30	Convert the regular expression `(a|b)*abb` into an equivalent NFA. How many states does the resulting NFA have?						The resulting NFA will have 5 states.	2	NAT	NFA
31	Convert the following NFA into an equivalent DFA: State 0: ε -> {1, 2} State 1: a -> {1} b -> {2} State 2: a -> {3} b -> {3} State 3: a -> {3} b -> {3} How many states does the resulting DFA have?						The resulting DFA will have 4 states.	2	NAT	NFA
32	Determine the number of possible transitions from state (q_1) in a DFA with input alphabet ({0, 1}) and states ({q_1, q_2, q_3}).						There are 6 possible transitions from state (q_1).	2	NAT	DFA

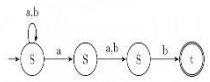
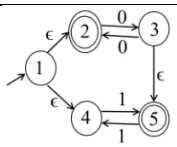
33	Calculate the number of states in the minimal DFA that recognizes the language described by the regular expression ((a|b)*abb).						The minimal DFA will have 4 states.	2	NAT	DFA
34	Given a regular expression ((a|b)*abb), how many distinct paths can an NFA have for the string "abb" starting from the initial state?						The NFA can have 2 distinct paths for the string "abb".	2	NAT	RE
35	How many states does a minimal DFA have that recognizes the language defined by the regular expression (a*b*)?						The minimal DFA will have 3 states.	2	NAT	DFA

UNIT I										
S.No	Question	Image	Option	Option	Option	Option	Correct	Mark	Type	Topic
1	Which type of automaton recognizes only regular languages?		DFA	CFG	PDA	TM	DFA	1	MCQ	Regular languages
2	What is the language accepted by a finite state machine with a single final state?		All possible strings	No string	Only the empty string	All strings except the empty string	All possible strings	1	MCQ	Regular languages
3	Which of the following is a regular language?		{0^n 1^n | n ≥ 0}	{0^n | n ≥ 0}	{1^n 0^n | n ≥ 0}	{1^n 0^2n | n ≥ 3}	{0^n | n ≥ 0}	1	MCQ	Regular languages
4	What is the complement of the language accepted by the NFA shown below?		Ø	{∈}	a*	{a,∈}	{∈}	1	MCQ	NFA
5	The string 1101 does not belong to the set represented by		110*(0+1)	1(0+1)*0101	(10)*(01)*(00+11)*	(00+(11)*0)*	(10)*(01)*(00+11)*	1	MCQ	Regular Expressions
6	What is the closure property of regular languages under union?		The union of two regular languages may or may not be regular	The union of two regular languages is never regular	The union of two regular languages is always regular	The union of two regular languages is only regular if they are identical	The union of two regular languages is always regul	1	MCQ	Regular languages

							ar			
7	Consider the following Deterministic Finite Automaton (M). Let A denote the set of eight bit strings whose second, third, sixth and seventh bits are 1. The number of strings in that are accepted by M is		0	1	2	3	1	1	MCQ	DFA
8	Which of the following language is regular?		{wwRx|x ,w∈{0,1} +}	{xww^R|x, w∈{0,1}$^+$}	{ww^R|w ∈ {0,1}$^+$}	{wxwR|x, w∈{0,1}+}	{wxw R|x, w∈{0 ,1}+}	1	MCQ	Regular languag es
9	Consider the following Finite State Automaton. The language accepted by this automaton is given by the regular expression		b*ab*ab *ab*	b*a(a+b)*	(a+b)*	b*ab*ab*	b*a(a+b) *	1	MCQ	∈-NFA, RE
10	What is the pumping lemma used for in TOC?		To prove a language is regular	To prove a language is context-free	To prove a language is non-regular	To prove a language is recursivel y enumera ble	To prov e a langu age is non-regul ar	1	MCQ	Pumpin g Lemma
11	Consider the automata below. The minimum state automaton equivalent to the above FSA has the following number of states		1	2	3	4	2	1	MCQ	FSA
12	Which of the following is regular?		{a^{n}b^n | n ≥ 0}	{a^n| n is prime}	{w|w has 3k + 1 b's for some k ∈N with Σ = {a, b}}	{ww | we Σ* with Σ = {0,1}}	{w|w has 3k + 1 b's for some k ∈N	1	MCQ	Regular languag es

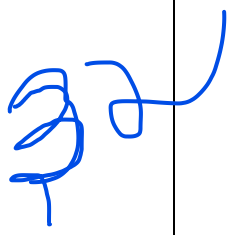
							with Σ = {a, b}}			
13	What are the two types of finite automata?		DFA and NFA	NFA and PDA	DFA and PDA	TM and PDA	DFA and NFA	1	MCQ	Automata Theory
14	The length of the shortest string NOT in the language over Σ = {a,b} of the following regular expression a*b*(ba)*a*		0	1	2	3	3	1	MCQ	Regular Expression
15	How many substrings of different lengths (non-zero) can be formed from a character string of length n?		n	n^2	2^n	n(n+1)/2	n(n+1)/2	1	MCQ	Automata Theory
16	What is the language accepted by a finite state machine with no final states?		All possible strings	No string	All string except the empty string	Only the empty string	No string	1	MCQ	Regular languages
17	Let N be an NFA with n states. Let k be the number of states of a minimal DFA which is equivalent to N. Which one of the following is necessarily TRUE?		$k \geq 2^n$	$k \geq n$	$n^2 \geq k$	$2^n \geq k$	$2^n \geq k$	1	MCQ	DFA, NFA
18	What is the closure property of regular languages under intersection?		The intersection of two regular languages is always regular	The intersection of two regular languages is never regular	The intersection of two regular languages may or may not be regular	The intersection of two regular languages is only regular if they are identical	The intersection of two regular languages is always regular	1	MCQ	Regular languages
19	Which of the following NFA with null transitions							1	MCQ	∈-NFA

	accepts the set of valid identifiers?									
20	Which of the following statement is TRUE about the regular expression 01*0?		It represents a finite set of finite strings.	It represents an infinite set of finite strings.	It represents a finite set of infinite strings.	It represents an infinite set of infinite strings.	It represents an infinite set of finite strings.	1	MCQ	Regular Expression
21	Let δ denote the transition function and δ^ denote the extended transition function of the ∈-NFA whose transition table is given below: (0 is the initial state): Find δ^(2,aba)	<table><tr><td>δ</td><td>∈</td><td>a</td><td>b</td></tr><tr><td>0</td><td>{2}</td><td>{1}</td><td>{0}</td></tr><tr><td>1</td><td>{2}</td><td>{2}</td><td>{3}</td></tr><tr><td>2</td><td>{0}</td><td>Ø</td><td>Ø</td></tr><tr><td>3</td><td>Ø</td><td>Ø</td><td>{2}</td></tr></table>	Ø	{0,1,3}	{0,2,3}	{0,1,2}	{0,1,2}	2	MCQ	∈-NFA
22	A minimum state deterministic finite automaton accepting the language L={w | w ε {0,1} *, number of 0s and 1s in w are divisible by 3 and 5, respectively} has		8	125	243	15	15	2	MCQ	Automata Theory
23	Consider the regular expression R=(a+b)∗(aa+bb)(a+b)∗ Which deterministic finite automaton accepts the language represented by the regular expression R?							2	MCQ	Regular Expressions, DFA

24	Which regular expression best describes the language accepted by the non-deterministic automaton below?		$(a+b)*$ $a(a+b)b$	$(abb)*$	$(a+b)*$ $a(a+b)*$ $b(a+b)*$	$(a+b)*$	$(a+b)*$ $a(a+b)b$	2	MCQ	NFA
25	The regular expression 0*(10*)* denotes the same set as		(1*0)*1*	0+(0+10)*	(0+1)*10(0+1)*	None of the above	(1*0)*1*	2	MCQ	Regular Expressions
26	Which of the following regular expressions are equivalent? (i)(00)*(∈+0) (ii)(00)* (iii) 0* (iv) 0(00)*		(i) and (ii)	(ii) and (iii)	(i) and (iii)	(iii) and (iv)	(i) and (iii)	2	MCQ	Regular Expressions
27	In some programming language, an identifier is permitted to be a letter followed by any number of letters or digits. If L and D denote the set if letters and digits respectively, which of the following defines an identifier?		$(L + D)^+$	(L.D)*	L.(L + D)*	$L.(L.D)^+$	L.(L + D)*	2	MCQ	Regular Languages
28	Let *r* = 1(1+0)*, s = 11*0 and t = 1*0 be three regular expressions. Then which of the following is true?		L(s)⊆L(r) and L(s) ⊆ L(t)	L(r)⊆L(s) and L(s) ⊆ L(t)	L(t)⊆L(s) and L(s) ⊆ L(r)	None of the above	L(s) ⊆L(r) and L(s) ⊆ L(t)	2	MCQ	Regular Expressions
29	Let M be the 5 state NFA with null transtitions as shown in the diagram below. Which one of the following regular expressions represents the language accepted by M?		(00)*+1(11)*	0*+(1+0(00)*)(11)*	(00)*+(1+(00)*)(11)*	0+1(11)*+0(11)*	0*+(1+0(00)*)(11)*	2	MCQ	∈-NFA

30	What is the closure property of regular languages under complementation ?		The comple ment of a regular language is only regular if it is identical	The complem ent of a regular language is never regular	The compleme nt of a regular language may or may not be regular	The complem ent of a regular language is always regular	The com plem ent of a regul ar langu age is alwa ys regul ar	2	MCQ	Regular Langua ge
31	Given the language L={ab,aa,baa}, which of the following strings are in L*?		$abaabaaabaa$	$aaaabaaaa$	$baaaaabaaaab$	$baaaaabaa$	1,2 and 4	1	MSQ	Regular Langua ge
32	Which of the following are regular sets?		{a^n|n≥0}	{a^nb^m|n=2m}	{a^nb^m|$n\neq m$}	{xcy|x,y,∈{a,b}*}	1,4	1	MSQ	Regular Langua ge
33	Which of the following is/are a regular language?		{0^n 1^n | n ≥ 0}	{0^n | n ≥ 0}	{1^n 0^n | n ≥ 0}	{1^n | n ≥ 0}	2	1	MSQ	Regular Langua ge
34	Which of the following regular expression identities is/are TRUE?		r(*) = r*	(r*s*) = (r+s)*	(r+s)* = r* + s*	(r*s*) = (rs)*	1 and 2	1	MSQ	Regular Expres sion
35	Consider a DFA M with the alphabet {a,b}. Which of the following statements are true?		DFA M can have multiple final states	DFA M can have multiple initial states.	DFA M can have transitions for every symbol in the alphabet from every state.	DFA M can have a dead state.	1, 3 and 4	1	MSQ	DFA
36	For a language L accepted by a DFA, which of the following statements are true?		If L is empty, the DFA must have at least one final state.	If L is non-empty, the DFA must have at least one final state.	If L is non-empty, the DFA must have at least one initial state.	If L is regular, its complem ent is not necessaril y regular.	1, 2 and 3	2	MSQ	DFA
37	For a language L accepted by a DFA, which of the following preserve		Union with another regular language	Intersecti on with another regular language	Subset of a regular language.	Kleene closure of a regular language.	1, 2 and 4	2	MSQ	Regular Langua ge

	regularity?									
38	Which of the following can be recognized by a DFA?		The set of all strings over {0,1} that contain an even number of '0's	The set of all strings over {a,b} that end with 'a'.	The set of all strings over {a,b} that contain 'ab' as a substring.	The set of all strings over {0,1} that start and end with the same symbol.	1,2,3 and 4	2	MSQ	DFA
39	If the regular set A is represented by $A=(01+1)*$ and the regular set B is represented by $B=((01)*1*)*$, which of the following is true?		$A \subset B$	$B \subset A$	A and B are incomparable	$A=B$	1	2	MSQ	Regular Expressions
40	Lex tools such as Flex are primarily used for:		Generating parsers from context-free grammars.	Generating lexical analyzers from regular expressions.	Optimizing code generation for interpreters.	Performing semantic analysis of source code.	2	2	MSQ	LEX tools
41	What is the minimum number of states required in a DFA to recognize the language {a, b}?						2	1	NAT	DFA
42	The number of states in the minimal DFA that accepts the language defined by the regular expression (0+1)*(0+1)(0+1)* is						2	1	NAT	DFA
43	What is the minimum number of states required in a DFA equivalent to a NFA with 4 states? (Best case scenario)						4	1	NAT	NFA

44	What is the minimum number of states required in a DFA equivalent to a NFA with 5 states? (Worst case scenario)						32	1	NAT	DFA
45	What is the minimum number of states required in a DFA to recognize a string in the language {a^n b^n | n ≥ 0}?						1	1	NAT	DFA
46	Consider the language L given by the regular expression (a + b)*b (a + b) over the alphabet {a, b}. The smallest number of states needed in a deterministic finite-state automaton (DFA) accepting L is						4	2	NAT	DFA
47	What is the maximum number of transitions possible in an NFA with 4 states and 3 inputs?						48	2	NAT	NFA
48	What is the maximum number of transitions possible in an NFA with 3 states and 2 inputs?						2	2	NAT	NFA
49	The number of states in the minimal DFA corresponding to the regular expression (0+1)*(10) is						3	2	NAT	DFA

50	Consider the following language. L = {x ∈ {a,b}* | No of a's in x is divisible by 2 but not divisible by 3} The minimum number of states in a DFA that accepts L is						6	2	NAT	DFA