

NOTE:”These are sample Paper to indicate pattern,May or not appear in examination”

Curriculum Scheme: Rev2016

Examination: First/Second/Third/Final Year Semester I/II/III/IV/V/VI/VII/VIII

Course Code: CSC405 ___ ___ and Course Name: TCS ___

Time: 2 hour

Max. Marks: 80

Q1	Given the language $L = \{ab, aa, baa\}$, which of the following strings are in L^* ? 1) abaabaaabaa 2) aaaabaaaa 3) baaaaabaaaab 4) baaaaabaa
Option A:	1, 2 and 3
Option B:	2, 3 and 4
Option C:	1, 2 and 4
Option D:	1, 3 and 4
Q2.	Consider the regular language $L = (111 + 11111)^*$. The minimum number of states in any DFA accepting this languages is:
Option A:	3
Option B:	5
Option C:	8
Option D:	9
Q3.	What is the output for the given language? Language: A set of strings over $\Sigma = \{a, b\}$ is taken as input and it prints 1 as an output "for every occurrence of a, b as its substring. (INPUT: abaaab)
Option A:	0010001
Option B:	0101010
Option C:	0111010
Option D:	0010000
Q4	Which of the following is not a regular expression?
Option A:	$[(a+b)^*-(aa+bb)]^*$
Option B:	$[(0+1)-(0b+a1)^*(a+b)]^*$
Option C:	$(01+11+10)^*$
Option D:	$(1+2+0)^*(1+2)^*$
Q5	The length of the shortest string NOT in the language (over $\Sigma = \{a, b\}$) of the following regular expression is _____. $a^*b^*(ba)^*a^*$
Option A:	2

Option B:	3
Option C:	4
Option D:	5
Q6	The regular expression $0^*(10^*)^*$ denotes the same set as
Option A:	A
Option B:	B
Option C:	C
Option D:	D
Q7	The smallest finite automation which accepts the language $\{x \mid \text{length of } x \text{ is divisible by } 3\}$ has :
Option A:	2 states
Option B:	3 states
Option C:	4 states
Option D:	5 states
Q8	Regular grammar is
Option A:	context free grammar
Option B:	non context free grammar
Option C:	english grammar
Option D:	none of the mentioned
Q9	Let the class of language accepted by finite state machine be L_1 and the class of languages represented by regular expressions be L_2 then
Option A:	$L_1 < L_2$
Option B:	$L_1 \geq L_2$
Option C:	$L_1 \cup L_2 = .^*$
Option D:	$L_1 = L_2$
Q10.	Simplify the given grammar: $S \rightarrow aXb$ $X \rightarrow aXb \mid e$
Option A:	a) $S \rightarrow aXb \mid ab, X \rightarrow aXb \mid ab$
Option B:	b) $S \rightarrow X \mid ab, X \rightarrow aXb \mid ab$
Option C:	c) $S \rightarrow aXb \mid ab, X \rightarrow S \mid ab$
Option D:	d) $X \rightarrow aXb \mid e$
Q11.	Which of the following does not have left recursions?
Option A:	Chomsky Normal Form
Option B:	Greibach Normal Form
Option C:	Backus Naur Form
Option D:	Regular form
Q12.	A grammar with more than one parse tree is called:

Option A:	Unambiguous
Option B:	Ambiguous
Option C:	Regular
Option D:	CFG
Q13	what is addition in pushdown automata as compare to finite state automata?
Option A:	Stack memory
Option B:	Input Tape
Option C:	Read Head
Option D:	None of them
Q14	A push down automata is said to be _____ if it has atmost one transition around all configurations.
Option A:	Finite
Option B:	Non regular
Option C:	Non-deterministic
Option D:	Deterministic
Q15	A PDA machine configuration (p, w, y) can be correctly represented as:
Option A:	(current state, unprocessed input, stack content)
Option B:	(unprocessed input, stack content, current state)
Option C:	(current state, stack content, unprocessed input)
Option D:	none of the mentioned
Q16	If the PDA does not stop on an accepting state and the stack is not empty, the string is:
Option A:	rejected
Option B:	goes into loop forever
Option C:	both (a) and (b)
Option D:	none of the mentioned
Q17	The language recognized by Turing machine is:
Option A:	Context free language
Option B:	Context sensitive language
Option C:	Recursively enumerable language
Option D:	Regular language
Q18	Turing machine consist of:
Option A:	Input tape
Option B:	Blank symbol
Option C:	Tape head
Option D:	All of these
Q19	A turing machine that is able to simulate other turing machines:
Option A:	Nested Turing machines
Option B:	Universal Turing machine

Option C:	Counter machine
Option D:	None of the mentioned
Q20	Which of the following a turing machine does not consist of?
Option A:	input tape
Option B:	head
Option C:	state register
Option D:	none of the mentioned

Q2	Solve any Four out of Six	5 marks each
A	Using pumping lemma , Check $a^n b^n n \geq 1$, is regular or not.	
B	Design a mealy machine to convert each occurrence of substring 'abb' by 'aba'.	
C	Design a FSM for testing divisibility by three.	
D	Obtain a Grammar to generate the language $L = \{ 0^n 1^{2n} n \geq 0 \}$	
E	Construct a PDA accepting $L = \{ a^n b^m a^n m, n > 1 \}$	
F	Write a short note on a) Recursive Language. b) Recursively enumerated language.	

Q3.	Solve any Two Questions out of Three	10 marks each
A	Design a Turing Machine which recognize the Language $L = \{ a^n b^n c^n n > 1 \}$	
B	Design a PDA for accepting a language $L = \{ WcW^R W \in \{a,b\}^* \}$	
C	Construct a NFA for the RE (01^*+1) and convert it to DFA.	