

**University of Mumbai**  
**Examination 2020 under cluster APSIT**

Program: Computer Engineering

Curriculum Scheme: Rev2016

Examination: Third Year Semester V

Course Code: CSC504 and Course Name: Theory of Computer Science

Time: 1 hour

Max. Marks: 50

For the students:- All the Questions are compulsory and carry equal marks .

Q1.	In a parse tree leaf node contains
Option A:	Start Symbol
Option B:	Production rules
Option C:	Non terminals
Option D:	Terminals
Q2.	Which of the following is Arden's theorem
Option A:	$R = Q + RP.$ $R = QP^*$
Option B:	$R = R + QP.$ $R = QP^*$
Option C:	$Q = R + QP.$ $R = QP^*$
Option D:	$Q = R + QP.$ $R = QR^*$
Q3.	A PDA can be formally described as a
Option A:	4-tuple $(Q, \Sigma, S, \delta)$
Option B:	5-tuple $(Q, \Sigma, \delta, q_0, F)$
Option C:	6-tuple $(Q, \Sigma, S, \delta, q_0, F)$
Option D:	7-tuple $(Q, \Sigma, S, \delta, q_0, l, F)$
Q4.	In PDA $\delta$ is the transition function defined as:
Option A:	$Q \times \Sigma \rightarrow Q$
Option B:	$Q \times X \rightarrow Q \times X \times \{\text{Left\_shift}, \text{Right\_shift}\}$
Option C:	$Q \times (\Sigma \cup \{\epsilon\}) \rightarrow 2^Q$
Option D:	$Q \times (\Sigma \cup \{\epsilon\}) \times S \times Q \times S^*$
Q5.	A Turing machine that is able to simulate other Turing machines:
Option A:	Nested Turing machines
Option B:	Multi tape Turing machine
Option C:	Universal Turing machines
Option D:	Multi Purpose Turing Machine
Q6.	A turing machine with several tapes in known as:
Option A:	Multi-tape turing machine
Option B:	Poly-tape turing maching
Option C:	Universal turing machine

**University of Mumbai**  
**Examination 2020 under cluster APSIT**

Option D:	Multi Purpose Turing Machine
Q7.	The value of n if turing machine is defined using n-tuples:
Option A:	6
Option B:	7
Option C:	8
Option D:	5
Q8.	Which of the following statements are false?
Option A:	Every recursive language is recursively enumerable
Option B:	Recursively enumerable language may not be recursive
Option C:	Recursive languages may not be recursively enumerable
Option D:	Every recursively enumerable language is recursive
Q9.	Which among the following options are correct? Statement 1: TMs can accept languages that are not accepted by any PDA with one stack. Statement 2: But PDA with two stacks can accept any language that a TM can accept.
Option A:	Statement 1 and 2, both are correct
Option B:	Statement 1 is correct, but Statement 2 is false
Option C:	Statement 2 is correct while Statement 1 is false
Option D:	Statement 1 and 2, both are false
Q10.	A language L is said to be _____ if there is a turing machine M such that $L(M)=L$ and M halts at every point.
Option A:	Turing acceptable
Option B:	Decidable
Option C:	Undecidable
Option D:	neither turing acceptable nor decidable
Q11.	Which problem states that any non-trivial semantic property of a language which is recognized by a Turing machine is undecidable. A property, P, is the language of all Turing machines that satisfy that property.
Option A:	Post Correspondence Problem
Option B:	Halting Problem
Option C:	Rice's Theorem
Option D:	Decidability Problem
Q12.	In this problem we have N number of Dominos (tiles). The aim is to arrange tiles in such order that string made by Numerators is same as string made by Denominators.
Option A:	Looping Problem
Option B:	Post Correspondence Problem
Option C:	Rice's Theorem
Option D:	Halting Problem

**University of Mumbai**  
**Examination 2020 under cluster APSIT**

Q13.	There are how many tuples in finite state machine.
Option A:	4
Option B:	5
Option C:	6
Option D:	7
Q14.	For which of the following applications regular expressions can be used?
Option A:	Traffic Light
Option B:	Developing string
Option C:	Simulating sequential circuits
Option D:	Designing computers
Q15.	At what phase of compiler grammar of the programming is checked?
Option A:	Code generation
Option B:	Syntax Analysis
Option C:	Code Optimization
Option D:	Semantic Analysis
Q16.	A pushdown automaton is a way to implement:
Option A:	Regular grammar
Option B:	Context-sensitive grammar
Option C:	Context-free grammar
Option D:	Unrestricted grammar
Q17.	Who invented the Turing machine?
Option A:	Alan Turing
Option B:	Mathew Turing
Option C:	Smith Turing
Option D:	John Hayes Turing
Q18.	Halting Problem is
Option A:	Decidable problem.
Option B:	Complex problem.
Option C:	An Undecidable Problem.
Option D:	Simple problem.
Q19.	Transition function of DFA maps.
Option A:	$\Sigma^* Q \rightarrow \Sigma$
Option B:	$Q^* Q \rightarrow \Sigma$
Option C:	$\Sigma^* \Sigma \rightarrow Q$
Option D:	$Q^* \Sigma \rightarrow Q$
Q20.	The basic limitation of finite automata is that
Option A:	It can't remember arbitrary large amount of information.
Option B:	It sometimes recognizes grammar that are not regular.

**University of Mumbai**  
**Examination 2020 under cluster APSIT**

Option C:	It sometimes fails to recognize regular grammar.
Option D:	It does everything
Q21.	Regular Expression denote precisely what of Regular Language.
Option A:	Class
Option B:	Power Set
Option C:	Super Set
Option D:	Subset
Q22.	While applying Pumping lemma over a language, we consider a string w that belong to L and fragment it into how many parts.
Option A:	2
Option B:	5
Option C:	3
Option D:	6
Q23.	Which of the production rule can be accepted by Chomsky grammar?
Option A:	$A \rightarrow CD$
Option B:	$A \rightarrow aB$
Option C:	$A \rightarrow Ba$
Option D:	$A \rightarrow Dd$
Q24.	In a parse tree leaf node contains
Option A:	Start Symbol
Option B:	Production rules
Option C:	Non terminals
Option D:	Terminals
Q25.	Which of the following is unit Production
Option A:	$A \rightarrow Ca$
Option B:	$A \rightarrow \epsilon$
Option C:	$A \rightarrow B$
Option D:	$A \rightarrow AB$