## COURSE CODE: CSE322

## Course Title: FORMAL LANGUAGES AND AUTOMATION THEORY

Time Allowed: 3 hrs Max. Marks: 60 Read the following instructions carefully before attempting the question paper. 1 Match the Paper Code shaded on the OMR Sheet with the Paper code mentioned on the question paper and ensure that both are the same. 2. This question paper contains 60 questions of 1 mark each, 0.25 marks will be deducted for each wrong answer. 3. All questions are compulsory. 4. Do not write or mark anything on the question paper except your registration no. on the designated space. 5. Submit the question paper and the rough sheet(s) along with the OMR sheet to the invigilator before leaving the examination hall. tuples in finite state machine. O. I There are b) 5 u) 4 c) 6 d) unlimited L2 CO1 Q. 2 The complement of a language will only be defined when and only when the over the language is defined. b) Word a) String c) Alphabet d) Grammar L2 CO1 O. 3 Which among the following is not notated as infinite language? a) Palindrome h) Reverse L2 CO1 c) Factorial d) L=, ab}\* O. 4 Let u='1101', v='0001', then uv=11010001 and vu= 00011101. Using the given information what is the identity element for the string? c) u'v' b) v1 d) c L2 CO1 a) u-1 Q. 5 How many languages are over the alphabet R? L2 COI b) countably finite c) uncountable finite d) uncountable infinite a) countably infinite Q. 6 A language is regular if and only if d) accepted by Turing machine L4 CO2 b) accepted by PDA c) accepted by LBA a) accepted by DFA Q. 7 How many strings of length less than 4 contains the language described by the regular expression (x+y)\*y(a+ab)\*? d) 11 L4 CO2 a) 7 b) 10 c) 12 .Q. 8 Which of the following is true? b) (0+1)\*0(0+1)\*1(0+1) = (0+1)\*01(0+1)\*a) (01)\*0 = 0(10)\* L4 CO2 c) (0+1)\*01(0+1)\*+1\*0\* = (0+1)\*d) All of the mentioned Q. 9 Regular expression are L4 CO2 d) Type 3 language c) Type 2 language a) Type 0 language b) Type 1 language Q. 10 Which of the following is true? b) Every finite subset of non-regular set is regular a) Every subset of a regular set is regular L4 CO2 d) Infinite union of finite set is regular c) The union of two non regular set is not regular Q.11 The entity which generate Language is termed as: L4 CO5 d) Data c) Grammar b) Tokens a) Automata Q. 12 Which of the following statement is false? a) Context free language is the subset of context sensitive language b) Regular language is the subset of context sensitive language c) Recursively ennumerable language is the super set of regular language L4 CO5 ✓ d) Context sensitive language is a subset of context free language Q. 13 Which among the following cannot be accepted by a regular grammar? b) L is a set of binary complement a) L is a set of numbers divisible by 2 ✓ d) L is a set of 0<sup>n</sup>1<sup>n</sup> L4 CO5 c) L is a set of string with odd number of 0 Q. 14 The Grammar can be defined as: G=(V, ∑, p, S) In the given definition, what does S represents? c) Sensitive Grammar d) None of these L4 COS b) Starting Variable a) Accepting State Page 1 of 4

Q. 15 For a DFA acc	epting binary numbers	whose decimal of	quivalent is divi	sible by 4, what are all	the possible
remainders? a) 0	b) 0,2		c) 0,2,4	d) 0,1,2,3	L2 COI
Q. 16 Which of the f	allowing is not a notio	n of Context free	grammars?		
<ul> <li>Q. 16 Which of the is</li> <li>a) Recursive Inference</li> </ul>	e b) Deriv	ations	c) Sentential for	ms d) All of the ment	ioned L5 CO3
Q. 17 Which of the f a) Recursive Inference	ollowing is/are the sui e	table approaches	for inferencing? b) Derivations		
c) Recursive Inference	e and Derivations d		) None of the m		. L5 CO3
Q. 18 If w belongs to a) program	b) SQL-	, then w has a par query c) X	se tree, which de ML document	fines the syntactic struc d) All of the mentioned	ture of w. w could be; L5 CO3
O 19 A-Dalalb T	he number of steps to	form aab:			
a) 2	b) 3		c) 4	d) 5	L5 CO3
those could make the	e expression correct.	ws. Figure out nu	mber of incorrec	notations or symbols, s	such that a change in
L(G)={w in T* S→* a) 0 Errors	b) 1 Error	c) 2 Error	d) Invalid Expr	ession L5 CC	03
Q. 21 Which of the L={a"b"c"  m>=1}	following the given la	nguage belongs to	57		
a) Context free lang	uage		b) Regular lang	uage	
	uage & Regular langu	nge	d) None of the	nentioned	L5 CO3
Q. 22 Which of the a) Every CFG for L c) Every CFG is als	is ambiguous	are correct for a c	oncept called inh b) Every CFG f d) None of the	erent ambiguity in CFL? or L is unambiguous mentioned L5 C0	
Q. 23 Which of the a) Parikh's theorem	theorem defines the e	xistence of Parikh bi theorem	s theorem? c) AF+BG theo	rem d) None of the me	ntioned L5 CO3
Q. 24 Choose the o Statement: There es a) true	cists two inference app	roaches: Recursiv ially true c) l	e Inference & De false d	rivation ) none of the mentioned	L5 CO3
Q. 25 What the doo	es the given CFG defin d w denotes terminal	es?			
a) wwr	b) wSv				
c) Equal number of		e of the mentione			L5 CO3
Q. 26 If L1 and L2 a) L1*	are context free langu b) L2	ages, which of the U L I	c) L1.L2	itext free? i) All of the mentioned	L4 CO5
Q. 27 For the given its grammar is:	n Regular expression, t	he minimum num	ber of variables i	neluding starting variab	le required to derive
(011+1)*(01)*					11000
a) 4	b) 3		c) 5	d) 6	L4 CO5
Q. 28 A grammar G B->aC	3=(V, T, P, S) is	if every p	roduction taken of	one of the two forms:	
B->a a) Ambiguous	b) Regular	c) Non Regul	ar d) None d	of the mentioned	L4 CO5
a real and the second	g the following is a Cl	G for the given I	anguage.		
L={ $x \in \{0,1\}$ * numb a) S-> $\varepsilon$  0S1 1S0 S	er of zeroes in x=num	ber of one's in x)			
<ul> <li>b) S-&gt;0B 1A  ε</li> <li>A-&gt;0S</li> </ul>					
B->1S					
√c) All of the mentio					
d) None of the men	tioned L4 CO5		1		
					Page 7 of d

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	Registratino No:			
Q. 30 Which of the following language $\sqrt{a}$ C b)	res are most suitable for i Peri c) Assembl	implement context free y Language d) None	languages? of the mentioned	L4 CO5
Q.31 A push down automaton emplo	ys data structu Linked List c	ire. ) Hash Table	d) Stack	L6 CO4
a) Queue b) Q. 32 Which of the following allows : a) Push Down Automaton b) Turing	stacked values to be sub-	stacks rather than just f Stack Automaton d) N	inite symbols? Ione of the mentioned	L6 CO4
Q. 33 A non deterministic two way, n a) 5 b)	ested stack automaton ha			L6 CO4
O 34 Push down automata accepts	lungunges.	) Type I	d) Type 0	L6 CO4
arruan	gible in PDA? Delete 6	) Insert	d) Add	L6 CO4
Q. 36 A string is accepted by a PDA ( a) Stack is not empty b) Accept	when otance state c) All of t	he mentioned d) None	e of the mentioned	L6 CO4
Q. 37 A turing machine operates over a) finite memory tape b) infinite n	t nemory tape (c) depends	on the algorithm d) n	one of the mentioned	L6 CO4
<ul> <li>Q. 38 Which of the problems were no</li> <li>a) Does a machine exists that can dete</li> <li>b) Does a machine exists that can dete</li> <li>c) Hilbert Entscheidungs problem</li> <li>d) None of the mentioned</li> </ul>	contract whether any armer	ary machine on its tape.	10 011 011108 1	04
Q. 39 Turing machine can be represent a) Transition graph b) Transition	table c) Queue and	Input tape d) All of t		54
Q. 40 The ability for a system of instr a) Turing Completeness b) Simulat	uctions to simulate a Tur ion c) Turing Halting	ing Machine is called d) None of the men	tioned	L6 CO4
<ul> <li>Q. 41 Which of the following is false</li> <li>a) Turing machine</li> <li>c) assumes a discrete time paradigm</li> </ul>	b)	theoretical model of co all of the mentioned	omputer	L6 CO4
Q. 42 Fill in the blank with the most a Statement: In theory of computation, a analyze the complexity of an algorithm	bstract machines are ofte	n used in r	regarding computability	or to
a) thought experiments b) princi	ple c) hypothesis	d) all of the mentioned	L6 CC	94
Q. 43 The following move of a PDA is a) Present state b) Input Symbol	c) Present state and Input	Symbol d) None of t	the mentioned	L6 CO4
Q. 44 Halting states are of two types. T a) Accept and Reject b) Reject and A	Allow c) Start and Rej	teasta a seconda cara dina cara		L6 CO4
Q 45 If d is not defined on the current a) does not halts b) halts c) goes	state and the current tap into loop forever	e symbol, then the mac d) none of the mentione	hine L6 C0	D4
Q. 46 Suppose A->xBz and B->y, then a) A->xyz b) A->xBz xyz			L4 CC	05
Q. 47 Given grammar G: S->aS A C A->a B->aa				
C->aCb Find the set of variables thet can produc	e strings only with the s	et of terminals.		
a) {C} b) {A,B} c) {A,B,S}	d) None of the	mentioned L4 CO:	5	

Q. 48 Given grammar: S->aS A				
A-≥a				
B->-aa				
Find the number of variable	es reachable from the Starting	Variable?		
a) 0	b) I 🗸			4 CO5
c) 2	d) None of the mentio	ned -	L	4005
nini Na sanga	Construction of the second	he doctorious in compiler		
	ata structure used to represent t	the derivations in complex.		
a) Queue	<ul> <li>b) Linked List</li> <li>d) Hash Tables</li> </ul>		1.	4 CO5
c) Tree				a construction attacker
0.50 Let w= xyz and y ru	fers to the middle portion and	y >0.What do we call the proce	ess of repeating y	0 or more times
before checking that they	still belong to the language L o	r nou:		L4 CO5
a) Generating	b) Pumping	c) Producing d) None of	the mentioned	LACOD
	~	A straight for t		
Q. 51 Fill in the blank in	terms of p, where p is the maxi	mum string length in L.		
	es trivially satisfy the pumping	c) p-1 d) None of the m	entioned L	4 CO5
a) p*1	b) p+1	and the second sec		
O S2 Let whe a string at	ad fragmented by three variable	x, y, and z as per pumping lem	ma. What does th	ese variables
represent?	in magnitum of over second			
<ul> <li>a) string count</li> </ul>		b) string		4 CO5
c) string count and string		d) none of the mentioned	L.	+.0.05
sectors and accessed and and a constrained and a sector		discourse another of node	e in the respective	parse tree are:
	E*(E) where * and brackets are	e the operation, number of node	a me une respective	
a) 6				
/ b)7				
c) 5 d) 2 L4 CO5				
htti	ns //aithub.com	n/sauravhathi		
Q. 54 Which among the	following is the root of the pars	e tree?	d) Starting Varia	ble 5, 14 CO5
a) Production P	b) Terminal T	c) Variable V	d) Starting varia	Inc 5 Cr cos
(). S.f. The desistion work	lem is the function from string t	0		
<ul> <li>a) char</li> </ul>	b) int			
c) boolean	d) none of the mentio	aned	L2 CO6	
~	Control and a second second second			
Q. 56 Which among the	following are undecidable theory	ries?		
a) The first order theory	of boolean algebra			
<ul> <li>c) The first order theory</li> </ul>	of Euclidean geomentry			
d) The first order theory	of the natural number with addi	tion, multiplication, and equality	y L2 CO6	
4				alte at autom
Q. 57 A language L is st	id to be if there	is a turing machine M such that	L(M)=L and M n	taits at every
point.	V b) decidable			
<ul> <li>a) Turing acceptable</li> <li>c) undecidable</li> </ul>	d) none of the mentio	med	L2 CO6	
c) undernaute	a) none of the ments			
Q. 58 The language acce	pted by a turing machine is call	ed		
a) Recursive Ennumerab		b) Recursive		12006
c) Recursive Ennumerable	e and Recursive	d) None of the mentioned		L2 CO6
Q. 59 Decidable can be t	aken as a synonym to:			
(a) recursive	b) non recursive			
c) recognizable	d) none of the mentio	ned	L	2 CO6
and an				
		s of whether or not they are acc	epted by a turing	machine that
a) Decidable b) Unde	cidable c) Computable	d) None of the mentioned	L2 CO6	
a) Decidable () Onde		(Question Paper	L2 CO0	