Continuous Assessment Test - II March 2023

Programme	: B.Tech (CSE) and its Specialization		
Course Code	: BCSE304L	Semester	: Winter Semester 2022-23
Course Title	:	Class Nbr(s)	: CH2022235001244
	Theory of Computation		CH2022235001292
			CH2022235001415
			CH2022235001456
Faculty(s)	: Dr. Amutha S		CH2022235001243
	Dr. Jani Anbarasi L	Slot	: B1+TB1
	Dr. Benil T		
	Dr. Kiruthika S		
	Dr. Karmel A		
Time	: 90 Minutes		
		Max. Marks	: 50

Answer all the Questions

Q. No.	Sub-division	Question Text	Marks
1.		Consider a regular expression, $R=(x + y)^* z\, (xy)^+$ that generate a language L.	
	a.	Construct an equivalent context-free grammar that can generate L.	2
	b.	Design a Pushdown automaton to recognize strings in L.	6
	c.	Justify the PDA designed in 1(b) accepts strings "yxzxyxy" in L.	2
2.		Consider the context-free grammar G: $(\{S,A,B,C\}, \{0,1, \varepsilon\}, P,S)$ with the set of productions P given below. $$S \rightarrow ABC$$ $$A \rightarrow 0AS \mid 0 \mid \varepsilon$$ $$B \rightarrow S1S \mid A \mid 11$$ $$C \rightarrow 1S \mid 0A \mid B \mid 00$$	
	a.	Derive any two words from G.	2
	b.	Construct an equivalent grammar G' which is in Chomsky Normal Form.	8
3.		Consider the grammar, G: $(\{S,A\}, \{a,b,c\}, \{S \rightarrow aSc \mid A, A \rightarrow bAc \mid \varepsilon\}, S)$.	
	a.	Define the langauge L generated by G.	3
	b.	Is the language L defined in 3(a) regular? Justify your answer.	7
4.		Consider the context-free grammar G: $(\{S,A,B\}, \{a,b,\varepsilon\}\, P,S)$ with the set of productions P given below.	1

S → aB | bA

A → a | aS | bAA | ε

B → b | bS | aBB | ε

Construct the pushdown automaton transitions and show that the automaton accepts the strings "abbb".

5.

Consider the context-free grammar G: ({S,A,B,C}, {a, b, c}, P, S) with the set of productions P given below.

S → AB | b

A → AB | CB | a

B → AB | b

C → AC | c

Construct an equivalent grammar G' in Greibach Normal Form.

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