Total No. of Questions: 3

Enrollment No. EN.22CS3011 75

Faculty of Engineering

Mid Sem-II Examination April-2024

CS3CO38 Theory of Computation

Programme: B. Tech **Branch/Specialization:** CSE All

Duration: 1.5 Hrs. **Maximum Marks: 30**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

				BL	CO	PO	PSO
Q.1	i.	The language $A \rightarrow tB \mid t$ generated by which of the following grammar? *a*) Type 0 *b*) Type 1 *c*) Type 2 *d*) Type 3	1	BL2	CO3	PO3	
	ii.	A context free language is called ambiguous if *a*) It has two or more LMD for some terminal string *b*) It has two or more RMD for some terminal string *c*) Both A and B *d*) None of these	1	BL1	CO3	PO2	
	iii.	The context free grammar $S \rightarrow SS \mid 0S1 \mid 1S0 \mid \in$ generates *a*) Unequal number of 0's and 1's *b*) Equal number of 0's and 1's *c*) Any number of 0's followed by any number of 1's *d*) None of these	1	BL2	CO3	PO4	
	iv.	Every context free grammar can be transformed into an equivalent push down automata. *a*) True *b*) False *c*) May be *d*) Can' t say	1	BL1	CO4	PO3	
	v.	Limitation of PDA can overcome by: *a*) Mealy machine *b*) Moore machine *c*) Turing machine *d*) FA	1	BL1	CO4	PO2	

	vi.	Push down automata accepts _____ languages. *a*) Type 0 *b*) Type 1 *c*) Type 2 *d*) Type 3	1	BL2	CO4	PO2
Q.2	i.	Find the CFG for the following language set- $L = \{a^n b^m c^m d^n \mid m, n \geq 1\}$	3	BL4	CO3	PO1
	ii.	Define ambiguous grammar. Give an example of ambiguous grammar and show why it is ambiguous?	3	BL3	CO3	PO2
	iii.	a) Convert the following grammar into CNF $S \rightarrow \sim S \mid [S \supset \$] \mid p \mid q$ b) Remove Useless symbols for the given grammar $S \rightarrow AB \mid CA$ $A \rightarrow a$ $B \rightarrow BC \mid AB$ $C \rightarrow aB \mid b$	6	BL5	CO3	PO3
OR	iv.	Convert the following grammar into GNF $S \rightarrow AB$ $A \rightarrow A0 \mid 0$ $B \rightarrow B1 \mid 1$	6	BL5	CO3	PO3
Q.3	i.	Define PDA. Write mathematical description of PDA.	3	BL1	CO4	PO1
	ii.	Write the properties of context free language.	3	BL2	CO4	PO2
	iii.	Design a PDA for following language set- $L = \{0^{2n}1^n \mid n \geq 1\}$	6	BL6	CO4	PO3
OR	iv.	Design a PDA for the following grammar- $S \rightarrow aB \mid bA$ $A \rightarrow a \mid aS \mid bAA$ $B \rightarrow b \mid bS \mid aBB$	6	BL6	CO4	PO3

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