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Code No. : 14248 O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (C.S.E./AIML) IV-Semester Backlog Examinations, August-2022

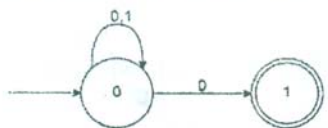
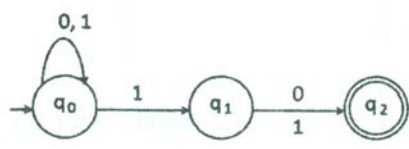
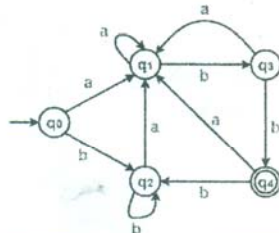
Automata, Languages and Computation

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Design a Finite automata that accepts only the words – baa, ab and abb and no other strings longer or shorter.	2	2	1	1,2
2.	Describe the language recognized by the following automata. 	2	2	1	1,2
3.	List any 4 closure properties of Regular languages	2	1	2	1,2
4.	Write the context free grammar for the language of even length palindromes over the alphabet {a,b}.	2	3	2	1,2
5.	Differentiate between finite automata and pushdown automata.	2	2	3	1,2
6.	Define pumping lemma for Context free languages.	2	1	3	1
7.	What is the significance of context sensitive grammar?	2	1	4	1
8.	Define the instantaneous description of a turing machine.	2	1	4	1
9.	What are Recursively enumerable Languages?	2	1	5	1
10.	Differentiate between PCP and MPCP.	2	1	5	1
Part-B (5 × 8 = 40 Marks)					
11. a)	Differentiate among DFA, NFA and epsilon-NFA.	4	2	1	1,2
b)	Convert the following NFA to DFA and also describe the language accepted by it. Check whether the input:0110 is accepted by the DFA or not. 	4	3	1	1,2,3
12. a)	Prove that the $L = \{a^i b^j \mid i \geq 0\}$ is not a regular language.	4	3	2	1,2
b)	Minimize the following DFA and draw the transition diagram for the minimized DFA. 	4	3	2	1,2

13. a)	Construct a PushDown Automata that accepts the language $L = \{ w c w^R \mid w = (a+b)^* \}$ and check whether the string abcca is accepted by the designed PDA.	4	3	3	1,2,3									
b)	Convert the given CFG to CNF. Consider the given grammar G1: $S \rightarrow a \mid aA \mid B$ $A \rightarrow aBB \mid \epsilon$ $B \rightarrow Aa \mid b$	4	3	3	1,2,3									
14. a)	Explain the different types of Turing machines.	4	1	4	1									
b)	Design a Turing machine that accepts the language $\{0^n 1^{2n} \mid n \geq 1\}$.	L=	4	3	4	1,2								
15. a)	Explain Satisfiability problem.	4	2	5	1									
b)	State Post correspondence problem (PCP) and find whether given instances of PCP has solution or not.	4	3	5	1,2,3									
List A List B w_i x_i														
<table border="1"> <tr> <td>1</td> <td>10</td> <td>101</td> </tr> <tr> <td>2</td> <td>01</td> <td>1</td> </tr> <tr> <td>3</td> <td>101</td> <td>01</td> </tr> </table>		1	10	101	2	01	1	3	101	01				
1	10	101												
2	01	1												
3	101	01												
16. a)	Draw the DFA for the regular expression $(a b)^* abb$	4	3	1	1,2									
b)	Check whether the given grammar is ambiguous or not. $S \rightarrow SS$ $S \rightarrow a$ $S \rightarrow b$	4	3	2	1,2									
17.	Answer any two of the following:													
a)	Consider the following grammar and check the acceptance of string $w = baaba$ using CYK Algorithm- $S \rightarrow AB / BC$ $A \rightarrow BA / a$ $B \rightarrow CC / b$ $C \rightarrow AB / a$	4	3	3	1,2									
b)	How does Turing Machines work as Transducers? Explain with an example.	4	2	4	1,2									
c)	Describe about the class P and NP problems and give an example for each.	4	2	5	1,2									

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	30%
iii)	Blooms Taxonomy Level – 3 & 4	50%
