

End Semester Examination

May-June 2023

CET2008B - Theory of Computation

Schedule ID: 19543

Faculty/School	Faculty of Engineering & Technology	Term	IV
Program	Second Year B. Tech	Duration	1 Hours 30 Minutes
Specialization		Max. Marks	40

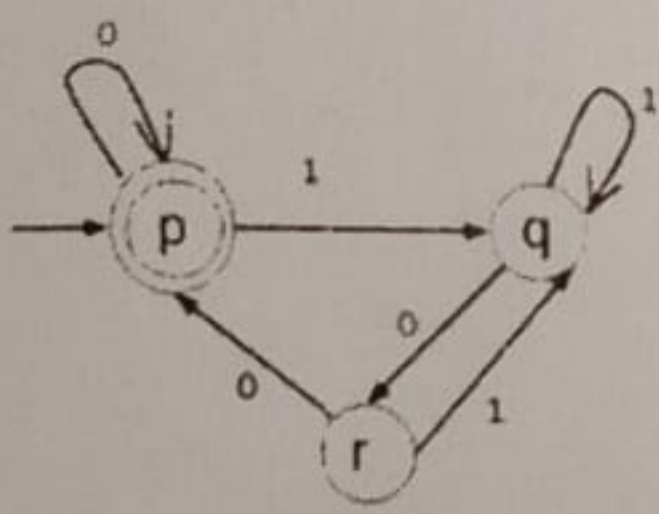
Read the instructions provided for every question properly before attempting the answer.

Section - 1 : contain(s) 10 question(s) and each question carries 5 mark(s). You can answer any 8 questions out of 10.

Click **Finish** only after completion of the Exam.

Section - 1 (8 X 5 Marks)

Answer any 8 questions

1	Construct an NFA to recognize a string that contains a substring 'abb'. List the applications of finite automata.	5 marks	CO1	Applying
2	<p>Apply the Arden theorem to discover the regular expression for the given finite automata.</p> 	5 marks	CO2	Applying
3	Explain Chomsky Hierarchy with neat diagram and example.	5 marks	CO3	Remembering

5	Check whether or not the following grammar is ambiguous. If it is ambiguous, remove the ambiguity and write an equivalent unambiguous Grammar. $E \rightarrow E+E$ $E \rightarrow E * E$ $E \rightarrow (E)$ $E \rightarrow a$	5 marks	CO3	Understanding
✓ 4	Construct Push down Automata for given CFG. $S \rightarrow aSa / bSb / x$ Evaluate designed PDA for String "abaxaba" according to language specification using instantaneous description.	5 marks	CO4	Applying
✓ 7	Make use of following points to compare Finite Automata and Pushdown Automata 1. Formal Definition 2. Transition Function 3. Example 4. Types of Grammar Recognized	5 marks	CO4	Remembering
✓ 8	Construct PDA for Language $L = \{a^n b^{2n} \mid n \geq 0\}$. Evaluate and show simulation of string "aabbbb".	5 marks	CO4	Applying
9	Design Turing machine that recognizes binary palindromes.	5 marks	CO4	Applying
✓ 10	Make use of given points to explain Turing machine. 1. Components of Turing machine 2. Halting problem of Turing Machine	5 marks	CO4	Remembering

END OF QUESTION PAPER

Q u
 $(a+b)^* a (a+b)^* a (a+b)^*$
 $A \rightarrow aAB \mid bAB \mid a \mid b \mid A$
 $B \rightarrow b \mid bB \mid \epsilon$
 $S \rightarrow AA \mid AaA$

Term End Examination

Dec 2023

CET2008B - Theory of Computation

Question Paper ID: 029239

Faculty/School	Engineering and Technology	Term	Sem-IV
Program	SY BTech CSE AIDS	Duration	1 Hours 30 Minutes
Specialization		Max. Marks	40

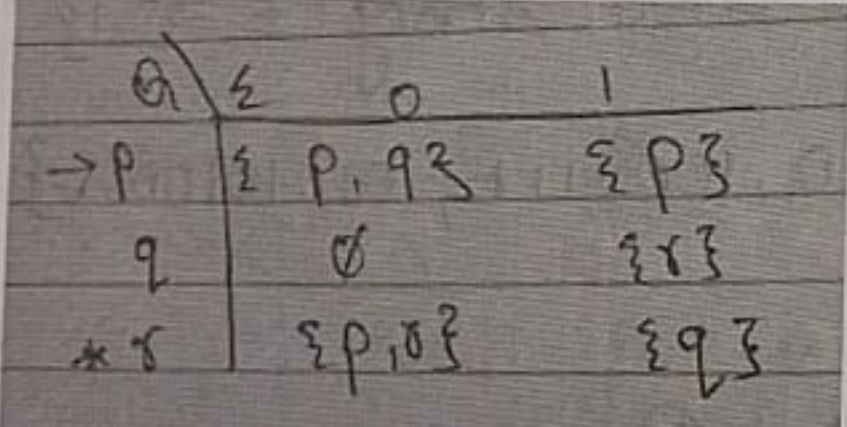
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Section - 1 (8 X 5 Marks)

Answer any 8 questions

1	<p>Convert the following NFA to DFA where $Q = \{p, q, r\}$, $E = \{0, 1\}$, $q_0 = \{p\}$, $F = \{r\}$ transition function is.</p> 	5 marks	CO1	Applying
2	<p>List closure properties of regular languages. Identify regular expression r for the regular language: $L(r) = \{00, 010, 0110, 01110, \dots\}$</p>	5 marks	CO1	Remembering
3	<p>Show the leftmost and rightmost derivation for the string "001100" by considering the grammar $G = \{(S, A), (0, 1), P, S\}$ where P consists of: $S \rightarrow 0AS \mid 0$ $A \rightarrow S1A \mid SS \mid 1$. State whether Grammar is ambiguous or not..</p>	5 marks	CO2	Applying
4	<p>Identify the CFG that generates following regular expressions:</p> <ol style="list-style-type: none"> a^*b^* $(baa+abb)^*$ 	5 marks	CO2	Understanding

5	Construct a PDA that accepts the following language. $L = \{a^n b^m c^n \mid n, m \geq 0\}$ by an empty stack.	5 marks	CO4	Applying
✓ 6	What are types of PDA? Write the formal definition of a PDA. List any 4 applications of a CEG?	5 marks	CO4	Remembering
7	Construct a pushdown automata for the CFG. $S \rightarrow 0BB$ $B \rightarrow 0S \mid 1S \mid 0$ Test whether 010000 is accepted or not.	5 marks	CO3	Applying
8	Design a Turing Machine to find the 1's complement of any binary number ? Write instantaneous description (ID) for string 01010111.	5 marks	CO4	Applying
✓ 9	Make use of given points to explain Turing machine 1. Components of Turing machine 2. Halting problem of Turing Machine	5 marks	CO4	Remembering
10	Explain Recursive Languages and Recursively Enumerable Languages with examples.	5 marks	CO3, CO4	Understanding

END OF QUESTION PAPER



End Semester Examination

May-June 2023

CET2023B - Formal Languages and automata theory

Schedule ID: 18757

Faculty/School	Faculty of Engineering & Technology	Term	IV
Program	Second Year B. Tech	Duration	1 Hours 30 Minutes
Specialization	C S B S	Max. Marks	40

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Click **Finish** only after completion of the Exam.

Section - 1 (8 X 5 Marks)

Answer any 8 questions

1	Design a Finite Automata that reads strings made up of letters in the word 'CHARIOT' and recognizes those strings that contain the word 'CAT' as a substring.	5 marks	CO1	Applying
2	Show by pumping lemma, L is not regular. $L = \{a^n b^n \mid n > 0\}$	5 marks	CO2	Applying
3	Explain Chomsky Hierarchy with neat diagram and example	5 marks	CO3	Remembering
4	Construct a PDA that accepts the following language $L = \{0^n 1^m 0^m \mid n, m > 0\}$ by final state	5 marks	CO3	Applying
5	1) Express the following grammar using CNF: $S \rightarrow ABA$ $A \rightarrow aA \mid \epsilon$ $B \rightarrow bB \mid \epsilon$	5 marks	CO3	Applying
6	What is the formal definition of the Turing machine? Explain all tuples of the Turing machine.	5 marks	CO4	Remembering
7	Design a Turing Machine to replace string 111 by 101 in binary input string.	5 marks	CO4	Analysing

8	Explain Multitape Turing Machine with a diagram.	5 marks	CO4
9	Differentiate between P and NP problems	5 marks	CO4
10	Explain the important terminologies of a Boolean expression in the satisfiability problem with the example.	5 marks	CO4

END OF QUESTION PAPER