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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION - JULY 2024

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| **Semester : III & IV& V** | **Date :09-07-2024** |
| **Course Code :CSE2018** | **Time :9:30AM-12:30PM** |
| **Course Name :Theory of Computation** | **Max Marks :100** |
| **Program :BTech** | **Weightage :50** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 5M=20M** | | | | |
| 1 | |  | | --- | | What you mean by concatenation of two strings. | | Explain the klene operation with a suitable example | | (CO1) | [Knowledge] |
|  | | | | |
| 2 | Differentiate finite automata and pushdown automata | (CO3) | [Knowledge] |
|  | | | | |
| 3 | Explain the positive closure operation with a suitable example | (CO2) | [Knowledge] |
|  | | | | |
| 4 | If L is a binary language . Represent the alphabet set of the language. | (CO3) | [Comprehension] |
|  | | | | |
| 5 | Write a regular expression for even binary numbers | (CO3) | [Apply] |
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| 6 | Explain length of string with suitable example | (CO1) | [Knowledge] |
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| **PART B** | | | | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | | | | |
| 7 | |  | | --- | | Construct automata for regular expression (0+1)\*01\* with Thomson construction method | |  | | | (CO2) | | [Apply] | |
|  | | | | | | |
| 8 | Apply pumping lemma theorem to find regularity of a language L={a^nb^n/n>=0} | | (CO3) | | [Comprehension] | |
|  | | | | | | |
| 9 | Minimize the following DFA to its equivalent machine?     |  |  |  | | --- | --- | --- | |  | 0 | 1 | | ->A | B | F | | B | G | C | | \*C | A | C | | D | C | G | | E | E | F | | F | C | G | | G | G | E | | H | G | C | | | (CO2) | | [Comprehension] | |
|  | | | | | | |
| 10 | | Convert given NFA to its equivalent DFA   |  |  |  | | --- | --- | --- | | Present State | Next State | | | 0 | 1 | | ->A | {B,D} | {F} | | B | {C} | {C,B} | | \*C | {A,C} | {C} | | D | {C} | {C,D} | | E | {B,E} | {F} | | | (CO2) | | [Comprehension] | |
|  | | | | | | |
| 11 | For the string aaabbabbba using the grammar S->aB|bA; A->a|aS|bAA ; B->b|bS|aBB Construct left most and right most derivation trees? Discuss about ambiguity of this grammar? | | (CO2) | | [Apply] | |
|  | | | | | | |
| 12 | Construct a deterministic pushdown automata machine to accept the language L={wCw^R/w(a,b)} | | (CO3) | | [Apply] | |
|  |  | |  | |  | |
| 13 | Construct a NPDA to accept the language L={ww^R/w(a,b)} | | (CO3) | | [Apply] | |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 15M=30M** | | | |
| 14 | |  | | --- | | Construct a PDA to accept the language L(G) where G=={S->aS/A; A->aBC;B->B}. | |  | | (CO3) | [Apply] |
|  | | | |
| 15 | Show string acceptance for 000111 for the turing machine to accept language L={0^n1^n, n>=0} | (CO4) | [Apply] |
|  | | | |
| 16 | Design a turing machine to accept language L={a^nb^n, n>0} | (CO4) | [Apply] |
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