

Program: **Computer Engineering**
Curriculum Scheme: Rev2016 (Keep the required)
Examination: TE Semester V

Course Code: and Course Name: THEORY OF COMPUTER SCIENCE

Time: 2 hour

Max. Marks: 80

| | |
|------------|---|
| Q1. | Choose the correct option for following questions. All the Questions are compulsory and carry equal marks |
| 1. | In general how many substrings are there in the string “stamp” |
| Option A: | 12 |
| Option B: | 16 |
| Option C: | 14 |
| Option D: | 18 |
| 2. | Σ^k is defined as the set of all the strings from the alphabet of length k. What is Σ^k? |
| Option A: | power |
| Option B: | alphabet |
| Option C: | string |
| Option D: | substring |
| 3. | a finite non empty set of symbols is called a _____ |
| Option A: | alphabet |
| Option B: | string |
| Option C: | word |
| Option D: | grammar |
| 4. | consider a dfa which accepts strings of length 8. How many strings will it accept of length 7 which begins with 10 over the the $\Sigma=\{0,1\}$. |
| Option A: | 60 |
| Option B: | 62 |
| Option C: | 128 |
| Option D: | 64 |
| 5. | construct the re for the statement: strings containing atleast 1 a |
| Option A: | a^*b |
| Option B: | a^*ba^* |
| Option C: | $(a+b)^*a(a+b)^*$ |
| Option D: | b^* |

| | |
|-----------|---|
| 6. | the language of all words with at least 2 a's can be described by the regular expression |
| Option A: | $(ab)^*a$ and $a(ba)^*$ |
| Option B: | $(a + b)^* ab^* a (a + b)^*$ |
| Option C: | $b^* ab^* a (a + b)^*$ |
| Option D: | all of these |
| 7. | The regular Expression for the following language : <i>The set of strings over the alphabet {0,1} starting with 0.</i> |
| Option A: | $(0+1)^*1$ |
| Option B: | $0(0+1)^*$ |
| Option C: | 0^*1 |
| Option D: | $0^*(0+1)^*$ |
| 8. | A given grammar is called ambiguous if |
| Option A: | two or more productions have the same non-terminal on the left hand side |
| Option B: | a derivation tree has more than one associated sentence |
| Option C: | there is a sentence with more than one derivation tree corresponding to it |
| Option D: | brackets are not present in the grammar |
| 9. | What is the type of language accepted by a Push down Automata according to Chomsky's Hierarchy? |
| Option A: | Type0 |
| Option B: | Type1 |
| Option C: | Type2 |
| Option D: | Type3 |
| 10. | Number of tuples used in defining a Grammar: |
| Option A: | 3 |
| Option B: | 4 |
| Option C: | 5 |
| Option D: | 6 |

| | | |
|------------------------------------|--|----------------------|
| Q2 20 Marks Total | Solve any Two Questions out of Three | 10 marks each |
| A | Change the occurrence of abb into aba using a Moore Machine. | |
| B | Draw an NFA for the RE $(a+b)^*baa^*$ and Convert it to DFA. | |
| C | What is Pumping Lemma for Context Free Languages? Explain | |

| | | |
|-------------------------------------|---|----------------------|
| Q3. 20 Marks Total | Solve any Two Questions out of Three | 10 marks each |
| A | Design a PDA for Odd Palindromes. | |

| | |
|---|--|
| B | Design a Turing machine for adding unary numbers $m+n$. |
| C | Explain the Halting Problem with examples |

| | | |
|-------------------------------------|--|----------------------|
| Q4. 20 Marks Total | Solve any Two Questions out of Three | 10 marks each |
| A | Design a PDA for Even Palindromes. | |
| B | Design a Turing machine for adding unary numbers $m*n$. | |
| C | Explain the Post Correspondence Problem in detail | |