Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **17MA3038** | **Duration :** | **3hrs** |
| **Sub. Name :** | **FORMAL LANGUAGES AND AUTOMATA THEORY** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Construct a grammar that generates the language | CO1 | 8 |
| b. | Construct a grammar G with the alphabets to generate the set of  (i) all Strings with exactly one a.  (ii) all strings with atleast one a.  (iii) all strings with no more than three a’s. | CO1 | 12 |
| (OR) | | | | |
| 2. | a. | Explain the different types of grammar and the language generated by the grammars. | CO1 | 12 |
| b. | Find the language L(G) over {a,b} generated by the grammar with productions →b, →aA, A→bA, A→b where is the starting symbol. | CO2 | 8 |
|  |  |  |  |  |
| 3. | a. | Show that the language is regular. | CO2 | 10 |
| b. | Convert the non deterministic finite automata to deterministic finite automata for the following figure.  NDFA | CO3 | 10 |
| (OR) | | | | |
| 4. | a. | Find the minimal deterministic finite automata for the language . | CO3 | 10 |
| b. | Find a deterministic finite accepter that recognizes the set of all strings on starting with the prefix ab. | CO3 | 10 |
|  |  |  |  |  |
| 5. | a. | Show that is not regular. | CO4 | 10 |
| b. | Show that the grammar with given as is right linear. | CO1 | 10 |
| (OR) | | | | |
| 6. |  | State and prove pumping lemma for regular languages. | CO4 | 20 |
|  |  |  |  |  |
| 7. | a. | Prove that the family of context – free languages is closed under union, concatenation and star-closure. | CO5 | 10 |
| b. | Show that is not context free. | CO5 | 10 |
| (OR) | | | | |
| 8. | a. | Given a context – free grammar, then show that there exist an algorithm for determining whether or not L(G) is infinite. | CO5 | 10 |
| b. | Show that the Language is a context sensitive Language. | CO5 | 10 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | For design a Turing machine that accepts | CO6 | 10 |
| b. | Given two positive integers x and y, design a Turing machine that computes x+y. | CO6 | 10 |