## University of Mumbai

Examination 2020

Program: BE Information Technology<br>Curriculum Scheme: Revised 2012<br>Examination: Second Year Semester IV<br>Course Name: Automata Theory

Time: 40 minutes
Max. Marks: 30

Note to the students:- All the Questions are compulsory and carry equal marks .

| Q1. | A R.E. for strings of even length over alphabet $\{\mathrm{a}, \mathrm{b}\}$ is: |
| :--- | :--- |
| Option A: | $(\mathrm{a} . \mathrm{b})^{*}$ |
| Option B: | $(\mathrm{a} / \mathrm{b})+$ |
| Option C: | (a/b).(a/b)+ |
| Option D: | (a/b).(a/b)* |
|  |  |
| Q2. | R.E. for binary numbers divisible by 8 is: |
| Option A: | $(0 / 1)+$ |
| Option B: | $1 .(1 / 0)^{*} .00$ |
| Option C: | $0+1 .(0 / 1)^{*} 000$ |
| Option D: | $0+1 .(0 / 1)^{*} 0$ |
|  |  |
| Q3. | A Non deterministic finite automata is a |
| Option A: | 2 |
| Option B: | 4 |
| Option C: | 5 |
| Option D: | 6 |
|  |  |
| Q4. | Which of the following is not true |
| Option A: | Every R.E. has a corresponding F.A. |
| Option B: | DFA is a subset of NFA |
| Option C: | NFA is a subset of DFA |
| Option D: | FAs accept regular languages |
|  |  |
| Q5. | Kleen's Theorem states that: |
| Option A: | Any context free language can be accepted by a FA |
| Option B: | Any regular language can be accepted by a FA |
| Option C: | Any regular language can be accepted by a PDA |
| Option D: | Any regular language can be accepted by a TM |
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| Q6. | Reducing a DFA results in: |
| Option A: | Approximation |

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| Option B: | Optimization |
| :--- | :--- |
| Option C: | Possible incorrect performance |
| Option D: | Addition of null transitions |
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| Q7. | Concept of stack is used in |
| Option A: | NFA |
| Option B: | DFA |
| Option C: | PDA |
| Option D: | TM |
|  |  |
| Q8. | Derivation trees for context free grammars can be: |
| Option A: | Optimal |
| Option B: | Approximate |
| Option C: | Ambiguous |
| Option D: | Unique to a string |
|  |  |
| Q9. | Automata theory is useful in |
| Option A: | Parsing |
| Option B: | Calculations |
| Option C: | Display output |
| Option D: | Read Input |
|  |  |
| Q10. | Halting problem is |
| Option A: | Solvable |
| Option B: | Unsolvable |
| Option C: | solved by PDA |
| Option D: | solves by TM |
|  |  |
| Q11. | With respect to capabilities which of the following is true? |
| Option A: | A TM can replace a FA and PDA |
| Option B: | A FA can replace a TM and PDA |
| Option C: | A PDA can replace a FA and TM |
| Option D: | A DFA can replace a NFA and PDA |
|  |  |
| Q12. | Which of the following is the best match |
| Option A: | Regular language and PDA |
| Option B: | Context free language and PDA |
| Option C: | Context free language and TM |
| Option D: | Regular language and TM |
|  |  |
| Q13. | A context free grammar corresponding to equal number of a's and b's is |
| Option A: | S-> aSb / ab |
| Option B: | S-> aSb / bSa / ab / ba |
| Option C: | S-> aSb / bSa / abS / baS / Sab / Sba / ^ |
| Option D: | S-> aSb , S-> ab |
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| Q14. | A tape in a TM is concept of: |
| Option A: | Memory |
| Option B: | Stack |
| Option C: | Data bus |
| Option D: | Address bus |
|  |  |
| Q15. | Pumping lemma is used to show: |
| Option A: | A language is context free |
| Option B: | A language is context sensitive |
| Option C: | A language is context recursively enumerable |
| Option D: | A language is not regular |
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