Reg. No. :

Question Paper Code: 55204

B.E./B.Tech. DEGREE EXAMINATION, SEP 2020

Fifth Semester

Computer Science and Engineering

15UCS504- THEORY OF COMPUTATION

(Regulation 2015)

Duration: One hour   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. Number of states required to accept string ending with 10.   CO1- U

 (a) 3   (b) 2   (c) 1   (d) Can't be represented

2. Given an arbitrary non-deterministic finite automaton (NFA)   CO1- R
 with N states, themaximum number of states in an equivalent
 DFA.

 (a) N^2   (b) 2^N   (c) 2N   (d) N!

3. Which of the following is NOT the set of regular expression   CO2- U

 R = (ab + abb)* bbab)

 (a) ababbbbab   (b) abbbab   (c) ababbabbbab   (d) ababababab

4. A language is represented by a regular expression $(a)^*(a + ba)$.   CO2- U
 Which of the following string does not belong to the regular set
 represented by the above expression?

 (a) aaa   (b) aba   (c) ababa   (d) aa

5. If L1 and L2 are context free languages, L1-L2 are context free: CO3- R

 (a) Always   (b) Sometimes   (c) Never   (d) None of the above

6. Which of the following strings is not generated by the following   CO3-U
 grammar? $S \rightarrow SaSbS|\varepsilon$

 (a) aabb   (b) abab   (c) aababb   (d) aaabb

7. A push down automata is said to be _____ if it has at most one transition around all configurations.   CO4- R

(a) Finite   (b) Non regular   (c) Non-deterministic   (d) Deterministic

8. Consider a language L for which there exists a Turing machine T, that accepts every word in L and either rejects or loops for every word that is not in L. The language L is   CO4- R

(a) NP Hard   (b) NP Complete   (c) recursive   (d) recursively enumerable

9. A Language L may not be accepted by a Turing Machine if :   CO4- R

(a) It is recursively enumerable   (b) It is recursive

(c) L can be enumerated by some turing machine   (d) None of the above

10. A Turing Machine represented ba a transition table has entry 1Lq4 corresponding to q3-row and 0-column then which of the following statement is false   CO4- R

(a) the symbol under read/write head is 0   (b) next state is q4

(c) q3 is the initial state   (d) all of the above

PART – B (3 x 8 = 24 Marks)

(Answer any Three of the following questions)

11. Give the state diagram of a DFA (or an NFA) that accepts only binary strings which represent numbers divisible by two or three. E.g., it accepts 0, 00, 10, 011, but it rejects the empty string, 1, 101, 0111.   CO1- App   (8)

12. Construct min DFA for the regular expression (a/b)* abb (a/b)*.   CO2- App   (8)

13. Show that the grammar S->a | abSb | aAb, ,A->bS | aAAb is ambiguous.   CO3- App   (8)

14. Show that if a language L is accepted by a PDA then there exists a CFG generating L.   CO4- U   (8)

15. Explain how the multiple tracks in a Turing Machine can be used for testing given positive integer is a prime or not.   CO4- U   (8)

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