R17

Code No: 5405AQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech II Semester Examinations, January - 2020
THEORY OF COMPUTATION
(Computer Science)

Time: 3hrs **Max.Marks:75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

5 × 5 Marks = 25

1.a) Discuss in detail about regular expressions and closure properties of regular expressions. [5]
b) Define push down automata? Write a note on acceptance of push down automata.[5]
c) Define Turing machine? Explain its working principle with suitable diagram. [5]
d) What is recursion theorem and write its applications? [5]
e) Define P and NP problems and compare each other. [5]

PART - B

5 × 10 Marks = 50

2.a) Define finite automata and explain its notations and mathematical representation.
b) Design finite automata to recognize strings which do not consist of two consecutive b's. [5+5]

OR

3.a) State Pumping lemma for regular sets and prove it.
b) Show that L={a^p/ p is prime}. [5+5]

4.a) Define ambiguity grammar? Check the following grammar is ambiguity or not.
E→E+E, E→E*E, E→(E) E→id
b) Design push down automata for L={WcW^R|W€{a,b}}. [5+5]

OR

5.a) Define Greibach Normal Form(GNF)? Write the procedure to convert the grammar to GNF.
b) Convert the following grammar to GNF. [5+5]
S→AB A→BS/b B→SA/a

6. Design a Turing machine for L={$a^nb^nc^n$|n>=1}. [10]

OR

7. Explain Variants of Turing machines. [10]

8. Explain decision algorithms for regular languages and illustrate with examples. [10]

OR

9.a) Prove that halting problem of a Turing machine is undecidable.
b) Explain Post Correspondence problem. [5+5]

10.a) Explain recursive and recursive enumerable languages and its properties.

b) Explain Cook's theorem. [5+5]

OR

11. Define NP complete problem and show that vertex cover problem is NP complete problem. [10]

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