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SRM UNIVERSITY

Ramapuram,Chennai

Department of computer science and enginnering

Model Examination

Sub Code / Tittle : PCS0204/ Theory of Computation **Date:**
Duration / Max mark : 3hrs / 100 marks **Sem /Year : IV / II**

PART A – (10 X 2 = 20 MARKS)

1. What is the difference between DFA and NFA?
2. Give regular set for the following expression: 1(01)*(10)*1
3. For the grammar G defined by S->AB, D->a,A->Aa,A->bB,B->Sb, give derivation tree for the sentential form babab
4. Give pumping lemma to prove that given language L is not Regular.
5. Give formal definition of PDA.
6. Give an example of a language accepted by a PDA but not by DPDA.
7. Prove that the function f(n)=n-1 is computable.
8. Design a Turning machine to compute n mod 2.
9. What is undecidability?
10. Differentiate between recursive and recursively enumerable language.

PART B – (5 x 16 = 80 MARKS)

11.i) a) Prove the equivalence of NFA and DFA with example. (8)

(OR)

1)Convert the regular expression (a/b)*abb into NFA

2) Define : Pumping lemma for regular and show that L={anbm / n>= 1}

12. i) a) Explain in detail the ambiguity in context free grammar. (8)
b) Convert the grammar S->ABb|a, A->aaA|B, B->bAb into greibach normal form. (8)

(OR)

i)Define LMD ,RMD and Parse tree with an example. Is the following grammar ambiguous:

S→ iCts / iCtses / a

C→ b

ii) Construct a CFG for the Language L = {ab,aabb,aaabbb……}

13 i) a) Construct PDA for the language L={ W / W is in (0+1)* and no of a's is equal to no of b's in W}

(OR)

ii) a) Construct a PDA for language $\{a^n b^{2n} / n>=1\}$(10)
b) State Pummping Lemma for CFL With Example(6)

14. i) a) Construct a Turing Machine to do the proper Multiplication (16)

(OR)

ii) a) Construct a Turning machine to perform Subtraction (8)
b) Explain About Modification of TM(8)

15.i) a) Discuss in detail about universal Turing machine. (8)
b) Explain about P and NP class Problem(8)

(OR)

ii) a) Prove that the union and intersection of two recursive languages are also recursive. (8)
b) Prove that there exists an recursively enumerable language whose complement is not recursively enumerable. (8)