SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

18CSC301T-FORMAL LANGUAGE AND AUTOMATA

4 Mark QUESTIONS

1. State and describe halting problem.
2. Is travelling salesman problem a NP or P Problem ? Justify
   Distinguish between time and space complexities
3. Compare NFA and PDA
4. Construct PDA that accepts the language generated by the grammar S->aSbb|aab
5. Draw a Turing machine which subtract two numbers m and n, where m is greater then n
6. Show that the union of two recursive language is recursive
7. Find whether the lists M = (abb, aa, aaa) and N = (bba, aaa, aa) have a Post Correspondence Solution?
8. Convert the given CFG to PDA. $S\rightarrow aB|bA$, $A\rightarrow a|aS|bAA$, $B\rightarrow b|bS|aBB$.
9. Prove that L=$\{a^i b^i c^i / i \geq 1\}$ is not context free.
10. Write short note on Modifications of Turing Machines.
11. Construct a Turing Machine for the string ending with b where $\sum\{a,b\}$.
12. What is undecidable problem. Give example.
13. Design a Turing Machine to reorganization the language L= $\{0^n 1^n| n \geq 1\}$
14. Define Instantaneous description of PDA.

15. Distinguish between time and space complexities .

12 Mark QUESTIONS

16. Construct a PDA for the language $\{WW^R / W$ in $(0+1)^* \}$ and check whether 0110 is accepted by PDA.

17. Construct CFG for the PDA

$\delta(q, a, Z) = (q, aZ)$

$\delta(q, b, Z) = (q, bZ)$

$\delta(q, a, a) = (q, aa)$

$\delta(q, b, b) = (q, bb)$,

$\delta(q, a, b) = (q, \varepsilon)$,

$\delta(q, b, a) = (q, \varepsilon)$,

$\delta(q, \varepsilon, Z) = (q, \varepsilon)$

18. Design TM for the language given in question 16(a).Show table and prove by induction
    w=00111

19. Explain the following with suitable examples

(i) NP type problem

(ii) NP complete type problem

(iii) NP hard type problem

20 .Construct PDA for the language L={WcW^R / W in (0+1)*} by null stack. Give example.

21. Solve the PDA P ={(p,q),{0,1}, {x,z0}, ş, q, z0) to a CFG if ş is given by   ş(q,1,z0) = {{q,xz0)}
ş(q,€,z0) = {{q,€)}

ş(q,1,x) = {{q,xx)}   ş(q,1,x) = {{p,€)}

ş(q,0,x) = {{p,x)}   ş(q,0,z0) = {{q,z0)}

22. Design TM for f(X,Y)=X*Y where X,Y are stored in the tape in the form 1^x01^y0.

23. Explain in details about the properties of recursive and recursively enumerable.