Outline

Headings you add to the document will appear here.

**CSE331: Automata and Computability**
**Quiz 3 SET: A Total Marks: 40**
**Allocated Time: 30 minutes**
**Name:** **ID:** **Section and Serial:**

Obtained Marks

**Part A: Context-Free Grammar [Each question contains 4 points. 5*4 = 20]**

a) L = {w ∈ {( , )}*: w is a valid parenthesis.}

$S \rightarrow (S) \mid SS \mid \varepsilon$

d) L = {w ∈ {a, b, 1}*: $a^n 1^{2n+m+3} b^m$, where n, m ≥ 0}

$a^n 1^{2n+m+3} b^m$

$\Rightarrow a^n 1^{2n} 1^m 1^3 b^m$

$S \rightarrow PQ$
$P \rightarrow aP11 \mid \varepsilon$
$Q \rightarrow 1Qb \mid 111$

or $a^n 1^{2n} 1^3 1^m b^m$

$S \rightarrow P111Q$
$P \rightarrow aP11 \mid \varepsilon$
$Q \rightarrow 1Qb \mid \varepsilon$

b) Convert the following Regular Expressions into a CFG: ( (aa+ bc)* a )* + cb

$((aa+bc)^* a)^* + cb$ (F, X, P, M, Y)

$S \rightarrow X \mid y$
$X \rightarrow PX \mid \varepsilon$
$P \rightarrow Ma$
$M \rightarrow FM \mid \varepsilon$
$F \rightarrow aa \mid bc$
$y \rightarrow cb$

c) L = {w ∈ {0, 1}*: length of w is odd and the mid is 1.}

$S \rightarrow 0S0 \mid 0S1 \mid 1S0 \mid 1S1 \mid 1$

or, $S \rightarrow XSX \mid 1$
$X \rightarrow 0 \mid 1$

Wrong Solve:
$S \rightarrow A1A$
$A \rightarrow 0A \mid 1A \mid \varepsilon$



d) L = {w ∈ {0,1}*: w is an odd-length palindrome.}

$S \rightarrow 0S0 \mid 1S1 \mid 0 \mid 1$

d) L = {w ∈ {0,1}*: w is an even-length palindrome.}

$S \rightarrow 0S0 \mid 1S1 \mid \varepsilon$

e) L = {w ∈ {0, 1}*: the length of w is three more than the multiple of four.}

$A \rightarrow MMMMA \mid MMM$
$M \rightarrow 0 \mid 1$

f) L = {w ∈ {0, 1}*: the length of w is two more than the multiple of three.}

$A \rightarrow MMMA \mid MM$
$M \rightarrow 0 \mid 1$

Headings you add to the document will appear here.

| | |
|---|---|
| | |

**[Solve the parse tree questions by your own.]**