



Inspiring Excellence

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**Subject** : Automata And Computability  
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**Section** : 18

Q1  $S \rightarrow AB$

$S \rightarrow aAb|AB|e$

$B \rightarrow CxR$

$C \rightarrow ccl|e$

$X \rightarrow x|x|e$

$R \rightarrow rpr|e$

Ans  $S \rightarrow AB$

$A \rightarrow OEI$

$O \rightarrow OOI|e$

$E \rightarrow IEl|e$

$B \rightarrow C$

$C \rightarrow qcl|e$

P1  $S \rightarrow MS0 / MT1$   $w: \{S, 1, 0\}$   $\emptyset$

$T \rightarrow MT0 / MW1$

$w \rightarrow MW0 / \#$

g1  $S \rightarrow P1 / \epsilon$

$P1 \rightarrow OP20 / 1P21$

$P2 \rightarrow OP30 / 1P31$

$P3 \rightarrow OP0 / 1P1 / \epsilon$

$L2 \rightarrow S \# S$

1  $S \rightarrow I \emptyset J K$

$I \rightarrow 1 \pi / 1 \pi / 1 / \pi I / \epsilon$

$J \rightarrow 2 / 22 / 222 J / 2222 J / \epsilon$

$K \rightarrow 1 / u / u u / \epsilon$

$$b) L = \{w \in \{0,1,2\}^* : w = 0^i 2^j 1^k \mid i, j, k \geq 0\}$$

$$(ii) a = 3k, j \text{ is odd and } i, j, k \geq 0$$

$$S \rightarrow 000S1/A$$

$$A \rightarrow 22A/2$$

$$(iv) S \rightarrow AB$$

$$A \rightarrow \infty A22/22$$

$$B \rightarrow 222B11/11$$

$$(vi) S \rightarrow 0S/2S/A$$

$$A \rightarrow 0A/2A/10$$

$$B \rightarrow 10/e$$

$$c) S \rightarrow 00S/01S/10S/11S/011$$

$$d) S \rightarrow 0S1/1S0/011/e$$

