

Q3) Draw DFA of following over  $\{0,1\}$ :

(i) All string of length at most 5.

(ii) construct a PDA from the following CFG.

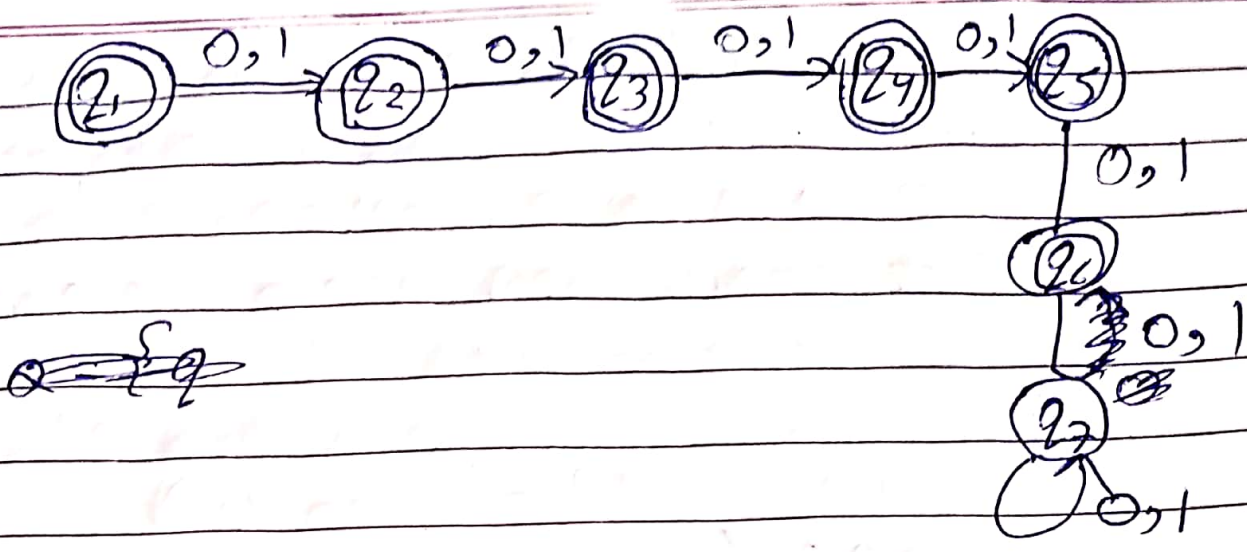
$G = (\{S, X\}, \{a, b\}, P, S)$  where the production are:

$S \rightarrow XS / \epsilon, A \rightarrow axb / Ab / ab$

Sol

(i)

DFA should accept the string of length 5 such as 10110, 00000, 11111, 01101, --- etc. The transition diagram is given by



(ii) Given:  $G = (\{S, X\}, \{a, b\}, P, S)$

where the production are

$$S \rightarrow XS / \epsilon, A \rightarrow axb / Ab / ab$$

let the equivalent PDA

$$P = (\{q\}, \{a, b\}, \{a, b, X, S\}, \delta, q, S)$$

where  $\delta \rightarrow$

$$\delta(q, \epsilon, S) = \{(q, XS), (q, \epsilon)\}$$

$$\delta(q, \epsilon, X) = \{(q, axb), (q, Xb), (q, ab)\}$$

$$\delta(q, a, a) = \{(q, \epsilon)\}$$

$$\delta(q, b, b) = \{(q, \epsilon)\}$$