

# CS & IT ENGINEERING

DPP - 02 Discussion Notes

Theory of Computation

Context Free Grammar:

Push Down Automata (PDA)

Part-I



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## TOPICS TO BE COVERED

01 Question

02 Discussion

**Q.1**

Which of the following is string accepting mechanism of PDA.

P  
W

**[MSQ]**

- A. PDA using final state. ✓
- B. PDA using empty stack. ✓
- C. PDA using both empty stack and final state. ✓
- D. PDA using transition state. ✗

**Q.2**

Which of the following is correct push operation:

**[MSQ]**

P  
W

A.

$$\cancel{\Sigma}(q, a, b) = (q', ab) \times$$

B.

$$\cancel{\delta}(q, a, b) = (q, ab) \checkmark$$

C.

$$\delta(q, a, b) = (q', ab) \checkmark$$

D.

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



**Q.3**

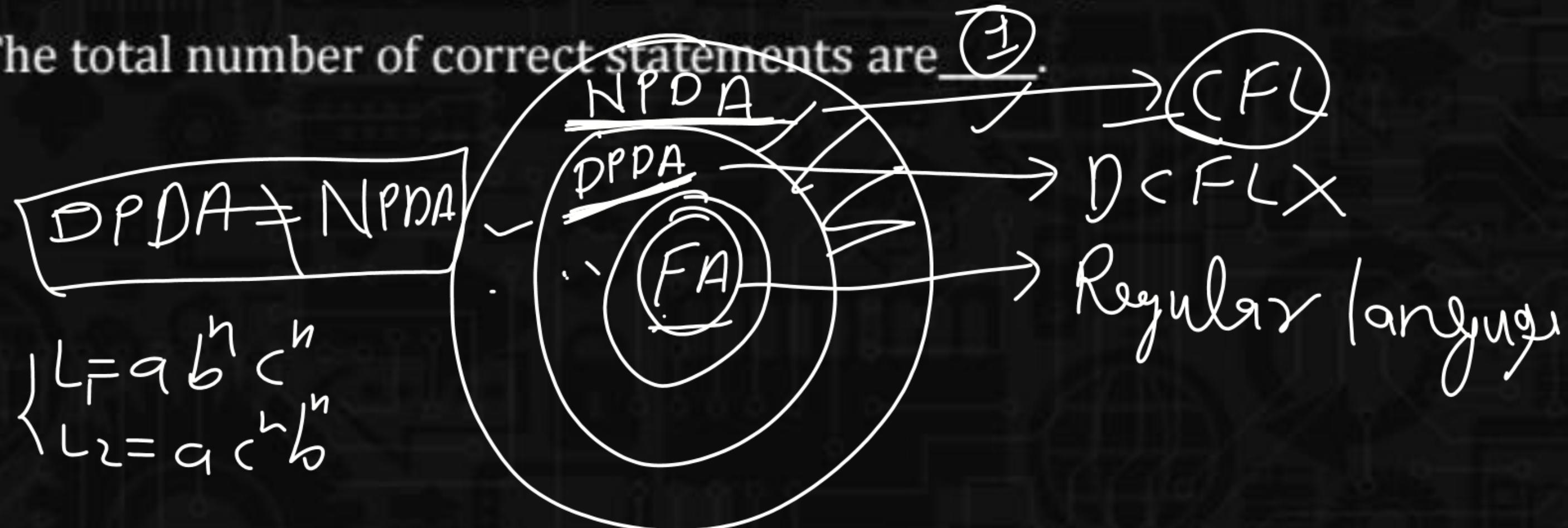
Consider the following statements:

**[NAT]**

P  
W

- (I) All DPDA are NPDA. ~~✓~~
- (II) All NPDA are DPDA. ~~✗~~
- (III) All NPDA and DPDA are equivalent. ~~✗~~
- (IV) All context free language are regular language. ~~✗~~

The total number of correct statements are 1.



**Q.4**

What does following transition means:

**[MCQ]**

P  
W

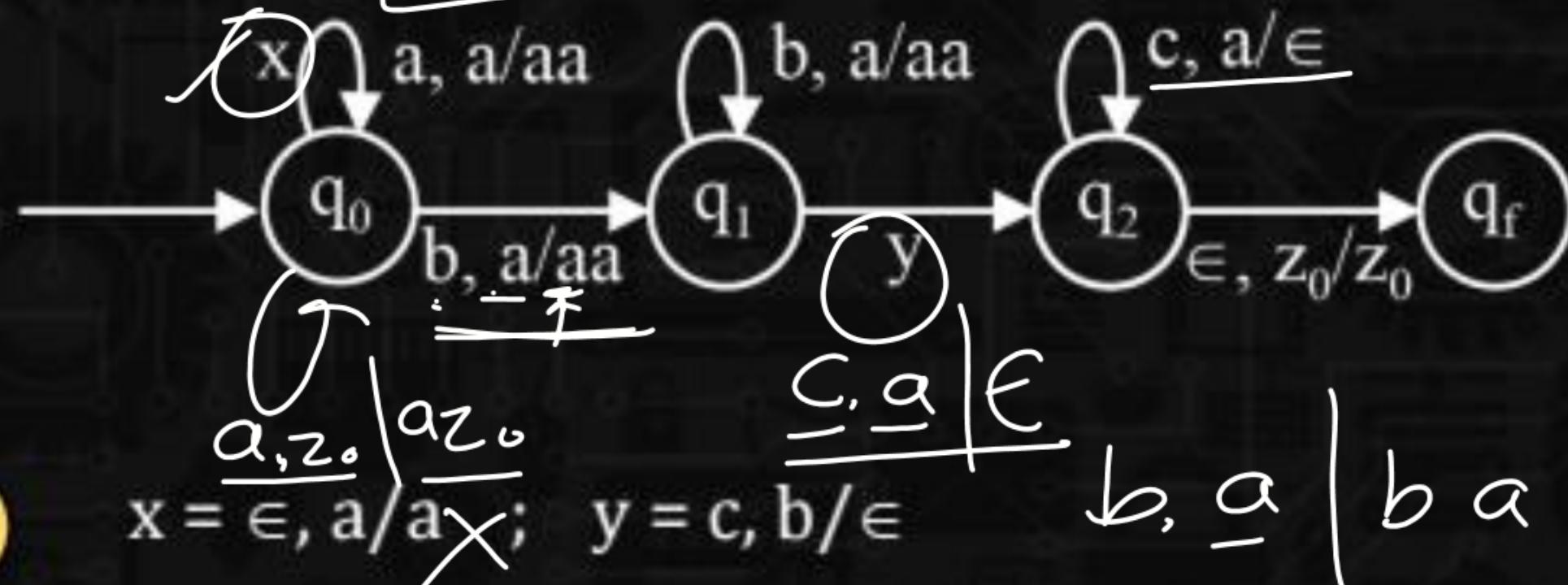
$$\delta(q, \emptyset, b) = (q', \underline{\underline{b}})$$

- A. Push b
- B. Pop b
- C. Read b
- D. No operation

**Q.5**

What are the values of x and y, if the language accepted by NPDA  
 is  $L = \{a^m b^n c^{(m+n)} | m, n \geq 1\}$ .

P  
W  
[MCQ]



A.

$$x = \underline{\epsilon, a/a} \cancel{x};$$

$$y = c, b/\epsilon$$

$$\underline{c, a} \mid \epsilon$$

$$b, \underline{a} \mid ba$$



B.

$$x = a, z_0/z_0 \cancel{x};$$

$$y = c, b/c$$

$$b, \underline{a} \mid qa$$



C.

$$x = a, a/aa \cancel{x};$$

$$y = b, c/c$$

D.

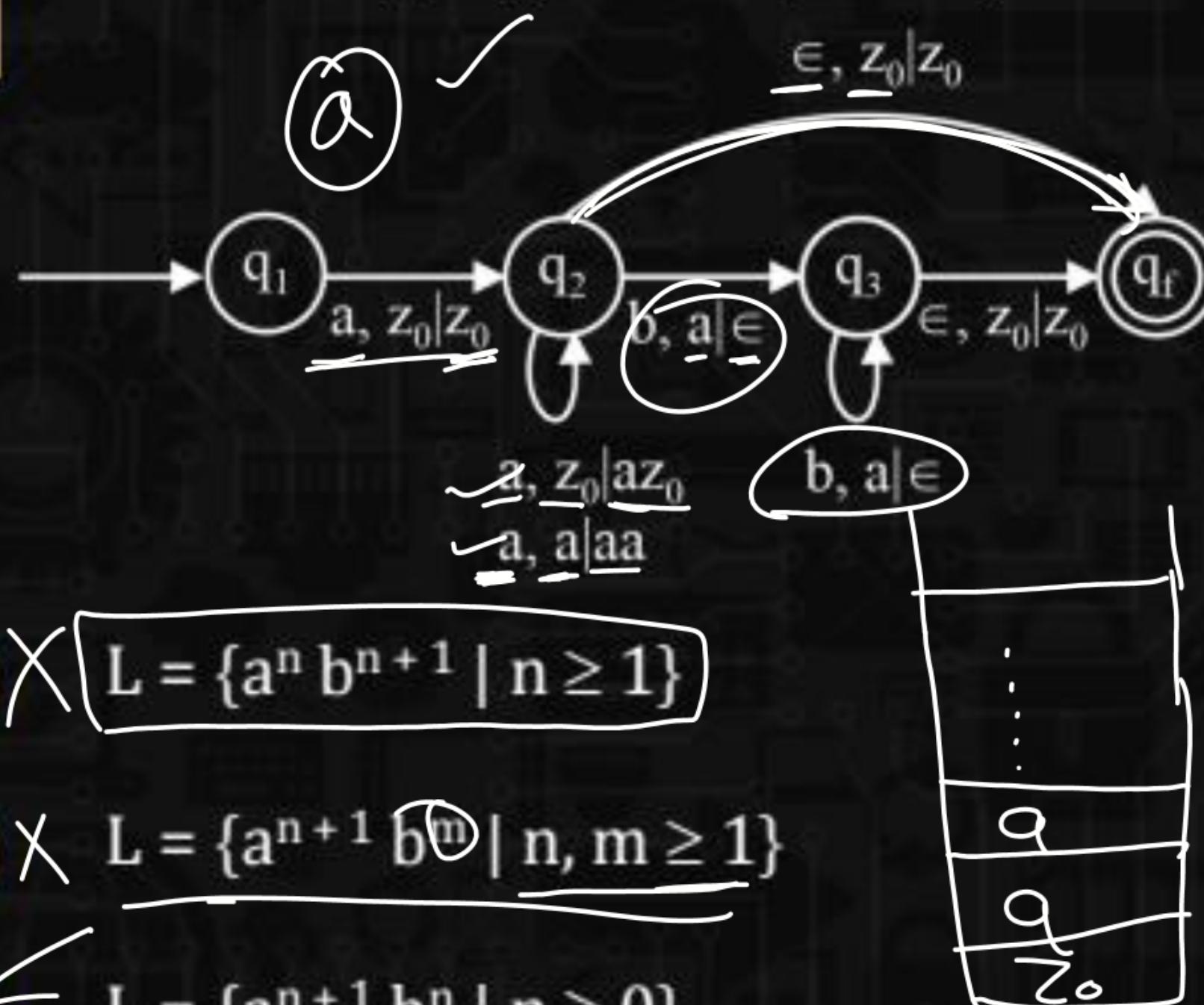
$$x = a, z_0/az_0;$$

$$y = c, a/\epsilon$$

Q.6

Which language is accepted by the following PDA.

[MCQ]

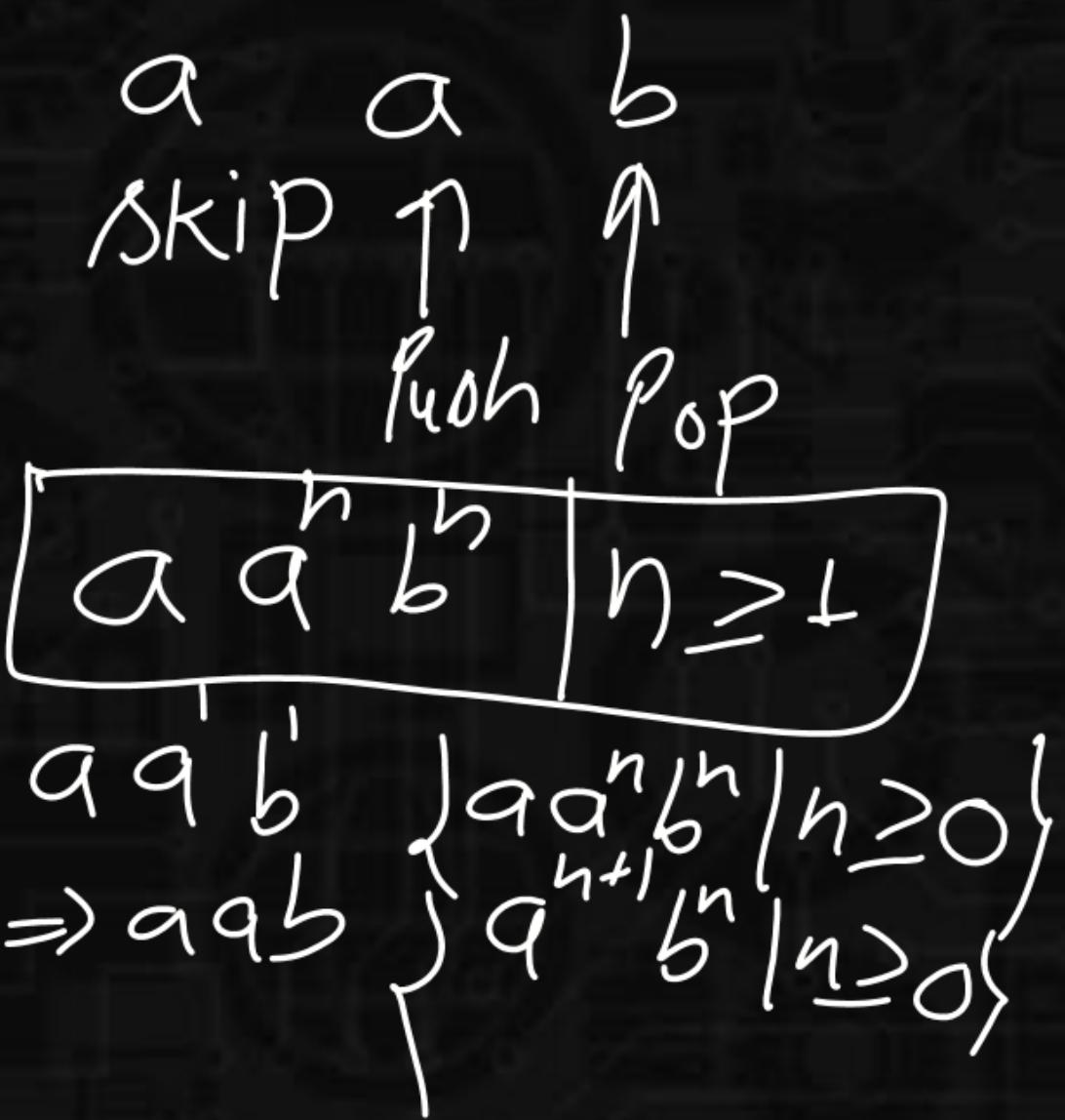
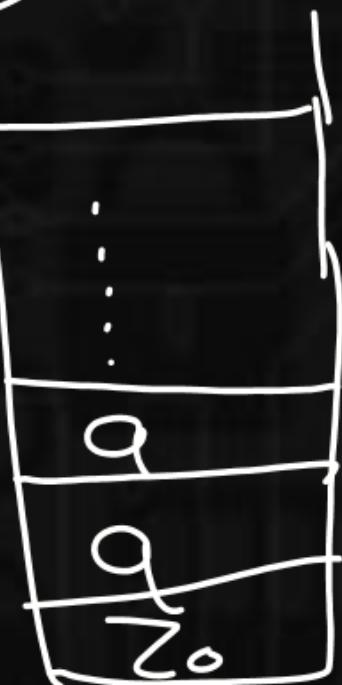
P  
W

A.   $L = \{a^n b^{n+1} \mid n \geq 1\}$

B.   $L = \{a^{n+1} b^m \mid n, m \geq 1\}$

C.   $L = \{a^{n+1} b^n \mid n \geq 0\}$

D.  $L = \{a^n b^{n+1} \mid n \geq 0\}$



Q.7

Which of the following languages are accepted by PDA.

[MSQ]

P  
W

A.

$$L = \{a^n b^n c^m \mid m, n \geq 1\}$$

(F)

B.

$$L = \{a^n b^n c^m \mid m \leq n\}$$

X

(Not P)

C.

$$L = \{a^n b^m c^n d^m \mid m, n \geq 0\}$$

X

(Not P)

D.

$$L = \{a^m b^n c^n d^m \mid m, n \geq 0\}$$

X

(Not P)

