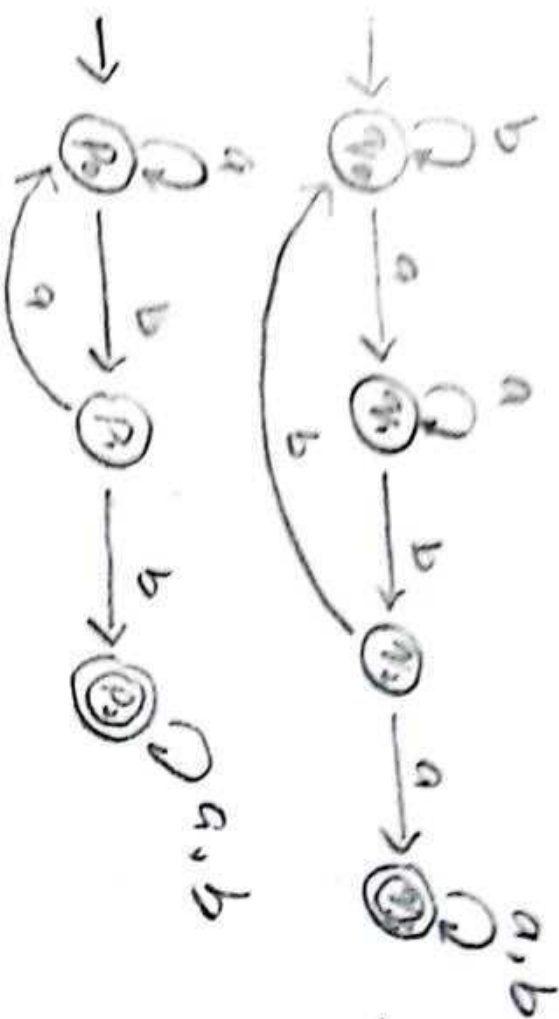


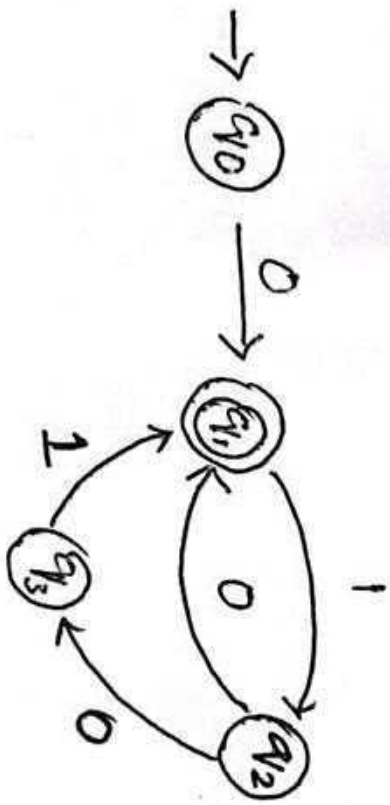
Q-1



bb, abc, abb, bba, aaba, abaa,  
baab, abcba, aabba, baab,  
abab, bbaab, bbaa,

	a	b
→ q <sub>0</sub> p <sub>0</sub>	q <sub>1</sub> p <sub>0</sub> ✓	q <sub>0</sub> p <sub>1</sub> ✓
q <sub>1</sub> p <sub>0</sub>	q <sub>1</sub> p <sub>0</sub> ✓	q <sub>2</sub> p <sub>1</sub> ✓
q <sub>2</sub> p <sub>1</sub>	q <sub>3</sub> p <sub>0</sub> ✓	q <sub>0</sub> p <sub>2</sub> ✓
q <sub>3</sub> p <sub>0</sub>	q <sub>1</sub> p <sub>2</sub> ✓	q <sub>0</sub> p <sub>2</sub> ✓
* q <sub>0</sub> p <sub>2</sub>	q <sub>1</sub> p <sub>2</sub> ✓	q <sub>3</sub> p <sub>1</sub> ✓
* q <sub>3</sub> p <sub>0</sub>	q <sub>3</sub> p <sub>0</sub> ✓	q <sub>2</sub> p <sub>2</sub> ✓
* q <sub>1</sub> p <sub>2</sub>	q <sub>1</sub> p <sub>2</sub> ✓	q <sub>3</sub> p <sub>2</sub> ✓
* q <sub>3</sub> p <sub>1</sub>	q <sub>3</sub> p <sub>0</sub> ✓	q <sub>0</sub> p <sub>2</sub> ✓
* q <sub>2</sub> p <sub>2</sub>	q <sub>3</sub> p <sub>2</sub> ✓	q <sub>3</sub> p <sub>2</sub> ✓
* q <sub>3</sub> p <sub>2</sub>	q <sub>3</sub> p <sub>2</sub> ✓	q <sub>3</sub> p <sub>2</sub> ✓

Q.2  
a



\_\_\_\_\_

b

Q-3

→ 1  
 $\{1, 2, 3, 4, 5\}$   
 $\{4, 5\}$   
 $\{4, 5, 2\}$   
 $\{5\}$   
 $\{4\}$   
 $\{3, 5\}$   
 $\{2\}$   
 $\{3\}$   
 $\{ \}$

a

$\{1, 2, 3, 4, 5\}$   
 $\{1, 2, 3, 4, 5\}$   
 $\{5\}$   
 $\{3, 5\}$   
 $\{ \}$   
 $\{5\}$   
 $\{ \}$   
 $\{3\}$   
 $\{ \}$   
 $\{ \}$

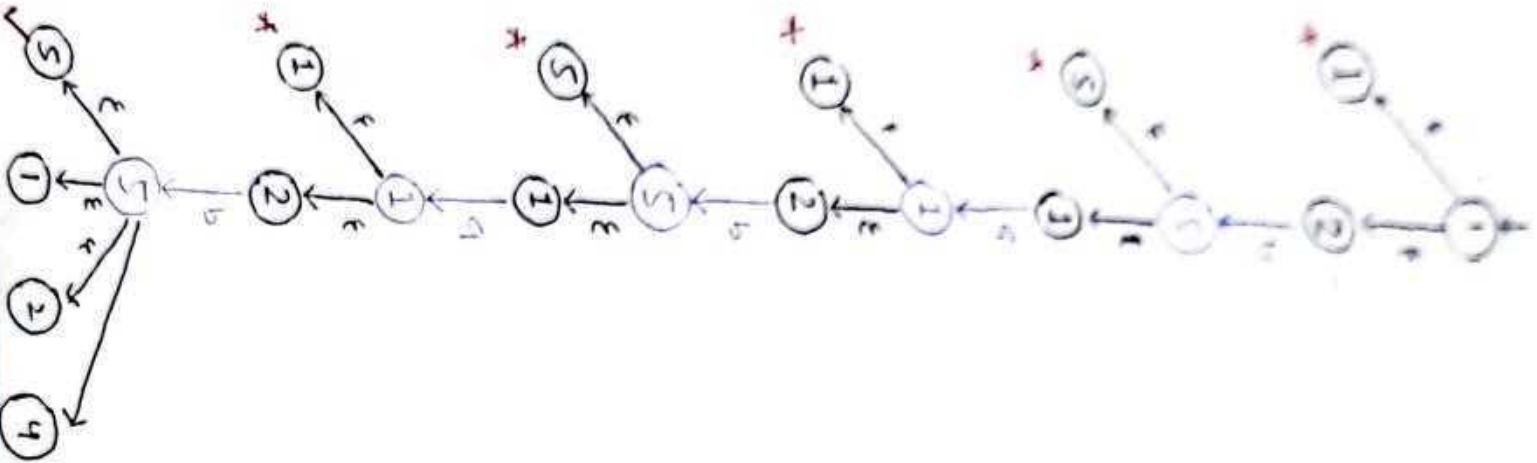
b

$\{4, 5\}$   
 $\{4, 5, 2\}$   
 $\{4\}$   
 $\{5, 4\}$   
 $\{ \}$   
 $\{4\}$   
 $\{2\}$   
 $\{5\}$   
 $\{2\}$   
 $\{ \}$

(b)

Question - 4

$1 \rightarrow \epsilon^* \rightarrow \{1, 2, 3, 4\}$   
 $2 \rightarrow \epsilon^* \rightarrow \{1, 2\}$   
 $3 \rightarrow \epsilon^* \rightarrow \{1, 2\}$   
 $4 \rightarrow \epsilon^* \rightarrow \{1, 2\}$   
 $5 \rightarrow \epsilon^* \rightarrow \{5, 1, 2, 3, 4\}$



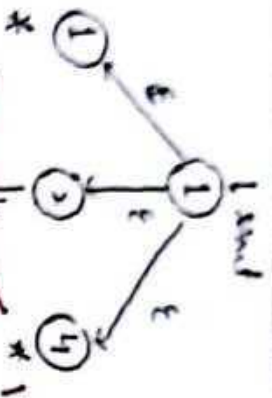
accept

DFS

$DFA \Rightarrow NFA$   
 $\downarrow$   
 $[NFA - \lambda]$

(a)

$1 \rightarrow \epsilon^* \rightarrow \{1, 2, 4\}$   
 $2 \rightarrow \epsilon^* \rightarrow \{2\}$   
 $3 \rightarrow \epsilon^* \rightarrow \{3\}$   
 $4 \rightarrow \epsilon^* \rightarrow \{4\}$   
 $5 \rightarrow \epsilon^* \rightarrow \{5, 1, 2, 4\}$

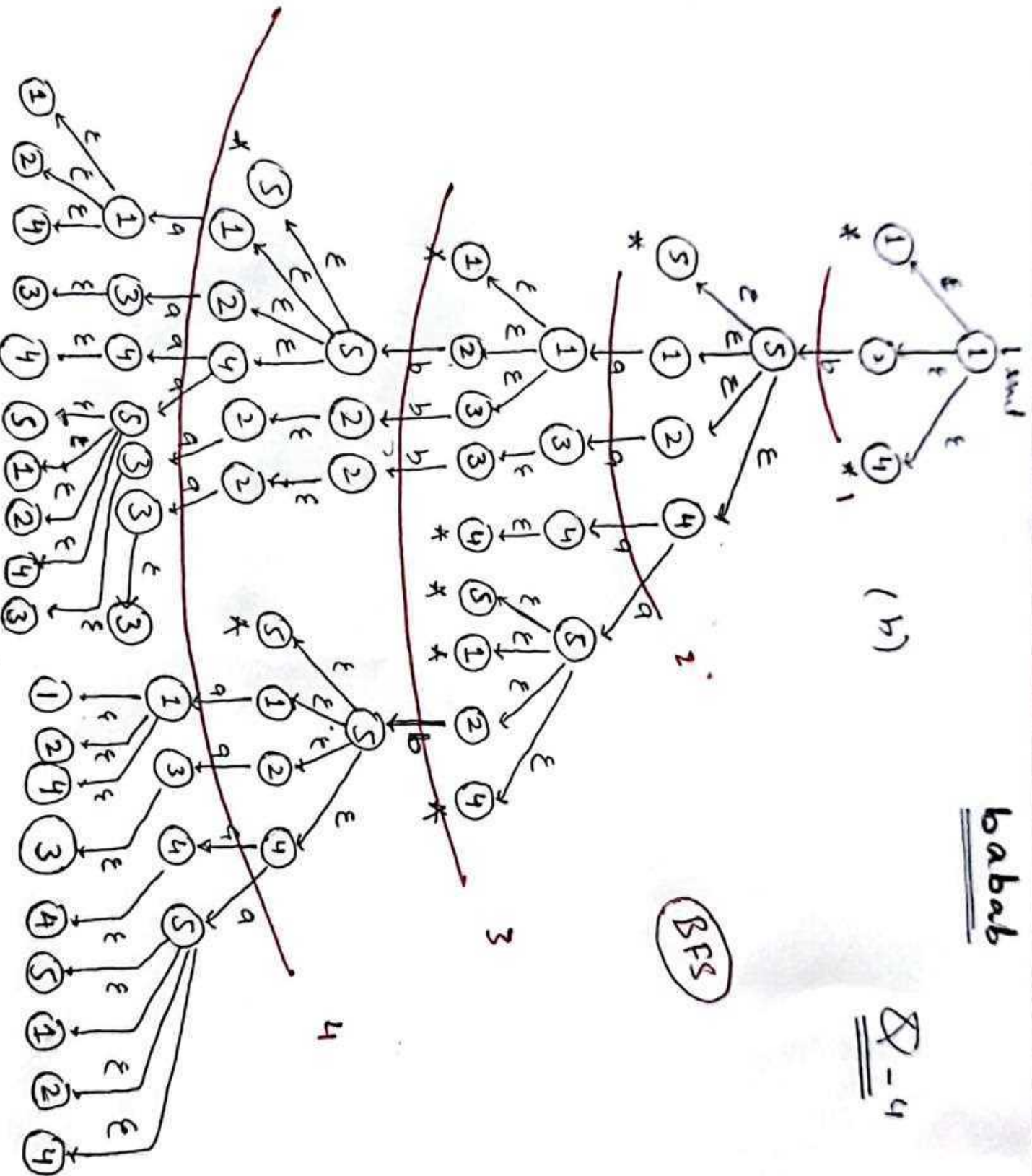


(h)

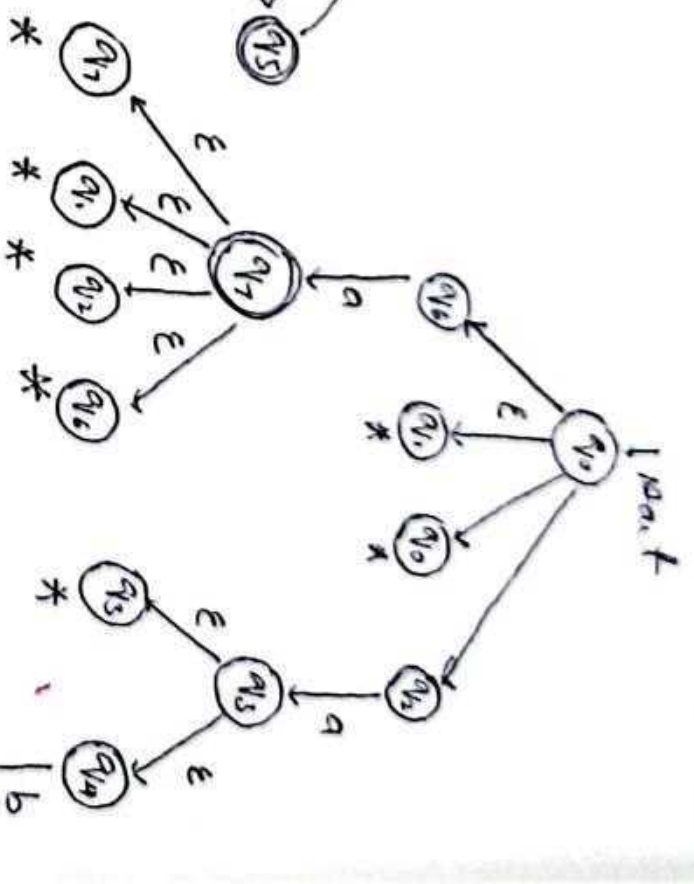
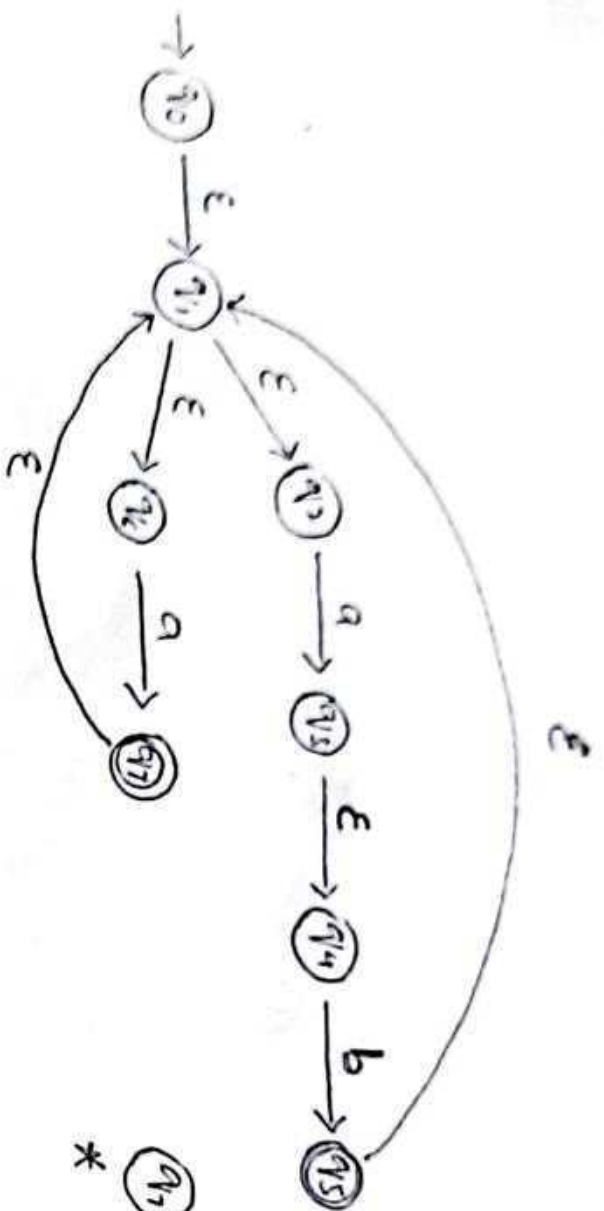
babab

Q-4

BFS







$\text{Stack} \rightarrow \underline{\text{N-closure}} \rightarrow \text{Transition} \rightarrow \underline{\text{N-closure}}$   
 $1 \rightarrow a$   
 $2 \rightarrow b$

Q-5

a)  $I^* O I^* (I^* O I^* O I^*)^* + O^* I O^* (O^* I O^* I O^*)^*$

b)  $[(a+b)^* (a a + a b a)^* (a+b)^*]^* b$