(b)

$r = (((00)^*(11))|01)^*$

Let $r_0 = (00)^*, r_1 = 11, r_2 = 01$

Let NFA M_0 recognise $L(r_0) = L(M_0)$, M_0 has:

- states $P = \{p_0, p_1\}$
- start state $p_0 \in P$
- accept state $A = \{p_0\}$
- transition function δ:

Input State	Letter	Output State
p_0	0	p_1
p_1	0	p_0

Let NFA M_1 recognise $L(r_1) = L(M_1)$, M_1 has:

- states $Q = \{q_0, q_1, q_2\}$
- start state $q_0 \in Q$
- accept state $A = \{q_2\}$
- transition function δ:

Input State	Letter	Output State
q_0	1	q_1
q_1	1	q_2

Let NFA M_2 recognise $L(r_2) = L(M_2)$, M_2 has:

- states $O = \{o_0, o_1, o_2\}$
- start state $o_0 \in O$
- accept state $A = \{o_2\}$
- transition function δ:

Input State	Letter	Output State
o_0	0	o_1
o_1	1	o_2

Let $r_3 = ((00)^*(11))|01$,
Combining M_0, M_1, M_2.
Let NFA M_3 recognise $L(r_3) = L(M_3)$, M_3 has:

- states $Q = \{s, o_0, o_1, o_2, p_0, p_1, q_0, q_1, q_2\}$
- start state $s \in Q$
- accept states $A = \{o_2, q_2\}$

- transition function δ:

Input State	Letter	Output State
s	ϵ	o_0
s	ϵ	p_0
p_0	0	p_1
p_1	0	p_0
p_0	ϵ	q_0
q_0	1	q_1
q_1	1	q_2
o_0	0	o_1
o_1	1	o_2

Now constructing the final NFA for r:
Let NFA M recognise $L(r) = L(M), M$ has:

- states $Q = \{s, o_0, o_1, o_2, p_0, p_1, q_0, q_1, q_2\}$
- start state $s \in Q$
- accept state $A = \{s\}$
- transition function δ:

Input State	Letter	Output State
s	ϵ	o_0
s	ϵ	p_0
p_0	0	p_1
p_1	0	p_0
p_0	ϵ	q_0
q_0	1	q_1
q_1	1	q_2
o_0	0	o_1
o_1	1	o_2
o_2	ϵ	s
q_2	ϵ	s