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Part A.

I)

1)	P	premise
2)	P → Q	premise
3)	S ∨ R	premise
4)	R → ~Q	premise
5)	Q	2, 1 modus ponens
6)	~R	4, 5 modus tollens
7)	S	3, 6 Disjunctive Syllogism
8)	[S ∨ X]	7 Addition

II)

1)	(~P ∨ Q) → R	premise
2)	R → (S ∨ X)	premise
3)	~S ∧ ~V	premise
4)	~V → ~X	premise
5)	~V	3 Simplification
6)	~X	4, 3 Modus Ponens
7)	~S	3 simplification
8)	~S ∧ ~X	7, 6 conjunction
9)	~(S ∨ X)	8 De Morgan's Law
10)	~R	2, 9 Modus Tollens
11)	~(~P ∨ Q)	1, 10 Modus Tollens
12)	~~P ∧ ~Q	11 De Morgan's Law
13)	~~P	12 simplification
14)	[P]	13 Double Negation

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Part B.

I. $[(P \vee Q) \wedge (P \vee \sim Q)] \vee Q$

1) $(P \wedge Q) \wedge (P \vee (\sim Q \vee Q))$ associativity

$(P \wedge Q) \wedge (P \vee T)$ inverse

$(P \wedge Q) \wedge T$ dominance

$\boxed{P \wedge Q}$ identity

II. $(P \rightarrow Q) \wedge [\sim Q \wedge (R \vee \sim Q)]$

1) $(P \rightarrow Q) \wedge \sim Q$ absorption

$(\sim P \vee Q) \wedge \sim Q$ material implication

$(\sim P \wedge \sim Q) \vee (Q \wedge \sim Q)$ distributivity

$(\sim P \wedge \sim Q) \vee F$ inverse

$(\sim P \wedge \sim Q)$ identity

$\sim (P \vee Q)$ De Morgan's Law

$\boxed{\sim (Q \vee P)}$ Commutativity

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1.

P	Q	R	S	~Q ①	P→Q ②	S∨R ③	R→① ④	P↔Q ⑤	⑤↔③ ⑥	⑥↔④ ⑦	X	S∨X ⑧	⑦→⑧
T	T	T	T	F	T	T	F	T	T	F	T	T	T
T	T	T	T	F	T	T	F	T	T	F	F	T	T
T	T	T	F	F	T	T	F	T	T	F	T	T	T
T	T	T	F	F	T	T	F	T	T	F	F	F	T
T	T	F	T	F	T	T	T	T	T	T	T	T	T
T	T	F	T	F	T	T	T	T	T	T	F	T	T
T	T	F	F	F	T	F	T	T	F	F	T	T	T
T	T	F	F	F	T	F	T	T	F	F	F	F	T
T	F	T	T	T	F	T	T	F	F	F	T	T	T
T	F	T	T	T	F	T	T	F	F	F	F	T	T
T	F	T	F	T	F	T	T	F	F	F	T	T	T
T	F	T	F	T	F	T	T	F	F	F	F	F	T
T	F	F	T	T	F	T	T	F	F	F	T	T	T
T	F	F	T	T	F	T	T	F	F	F	F	T	T
T	F	F	F	T	F	F	T	F	F	F	T	T	T
T	F	F	F	T	F	F	T	F	F	F	F	F	T
F	T	T	T	F	T	T	F	F	F	F	T	T	T
F	T	T	T	F	T	T	F	F	F	F	F	T	T
F	T	T	F	F	T	T	F	F	F	F	T	T	T
F	T	T	F	F	T	T	F	F	F	F	F	F	T
F	T	F	T	F	T	T	T	F	F	F	T	T	T
F	T	F	T	F	T	T	T	F	F	F	F	T	T
F	T	F	F	F	T	F	T	F	F	F	T	T	T
F	T	F	F	F	T	F	T	F	F	F	F	F	T
F	F	T	T	T	T	T	T	F	F	F	T	T	T
F	F	T	T	T	T	T	T	F	F	F	F	T	T
F	F	T	F	T	T	T	T	F	F	F	T	T	T
F	F	T	F	T	T	T	T	F	F	F	F	F	T
F	F	F	T	T	T	T	T	F	F	F	T	T	T
F	F	F	T	T	T	T	T	F	F	F	F	T	T
F	F	F	F	T	T	F	T	F	F	F	T	T	T
F	F	F	F	T	T	F	T	F	F	F	F	F	T

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2.

			①	②	③	④	⑤	⑥	⑦	
P	Q	R	~Q	P→Q	R∨①	①∧③	②∧④	Q∨P	~⑥	⑤↔⑦
T	T	T	F	T	T	F	F	T	F	T
T	T	F	F	T	F	F	F	T	F	T
T	F	T	T	F	T	T	F	T	F	T
T	F	F	T	F	T	T	F	T	F	T
F	T	T	F	T	T	F	F	T	F	T
F	T	F	F	T	F	F	F	T	F	T
F	F	T	T	T	T	T	T	F	T	T
F	F	F	T	T	T	T	T	F	T	T