

Model answer

Exercise n= 01(10 points) (01 point for each response)

	a	b	c	d	e						
1	X	X	X								
2	X										
3	X	X									
4			X								
5	X										
6	X	X	X								
7		X									
8		X									
9	X		X								
10	X										

Exercise n= 02(05 points)

1. (01.50 point)

a	b	c	F
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	T
F	T	F	T
F	F	T	T
F	F	F	F

a	b	c	F
F	F	F	F
F	F	T	T
F	T	F	T
F	T	T	T
T	F	F	T
T	F	T	T
T	T	F	T
T	T	T	T

2. CNF(01 point)

$(a \vee b \vee c)$

DNF (01 point)

$(a \wedge b \wedge c) \vee (a \wedge b \wedge \neg c) \vee (a \wedge \neg b \wedge c) \vee (a \wedge \neg b \wedge \neg c) \vee (\neg a \wedge b \wedge c) \vee (\neg a \wedge b \wedge \neg c) \vee (\neg a \wedge \neg b \wedge c)$

3. (01.50 point each one out 0.5)

F is not a tautology

F is not unsatisfiable

F is satisfiable

Exercise n= 03(05 points)

1. $p|q$ (1point)

p	q	$p \wedge q$	$\neg(p \wedge q) = p q$
T	T	T	F
T	F	F	T
F	T	F	T
F	F	F	T

2. $(p|q) | (p|q) = \neg(p \wedge q) | \neg(p \wedge q) = \neg((\neg(p \wedge q)) \wedge \neg(p \wedge q)) = (p \wedge q) \vee (p \wedge q) = (p \wedge q)$ (1 point)

p	q	$p \wedge q$
T	T	T
T	F	F
F	T	F
F	F	F

3. Other correct and logic solutions are accepted

The connector $\neg$: $\neg p \equiv \neg(p \wedge p) \equiv (p|p)$ (1 point)

The connector $\vee$: $p \vee q \equiv \neg(\neg p \wedge \neg q) \equiv (\neg p | \neg q) \equiv (p|p)|(q|q)$. (1 point)

The connector $\rightarrow$: $p \rightarrow q \equiv \neg p \vee q \equiv \neg(p \wedge \neg q) \equiv p | \neg q \equiv p|(q|q)$. (1 point)