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Section = "B"

Paper = Discrete Structure
Semester 2nd

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Q No(6)

Answer

$$(Z \wedge W) \vee (\sim Z \wedge W) \vee (Z \wedge \sim W)$$

$$= (Z \wedge W) \vee (Z \wedge \sim W) \vee (\sim Z \wedge W)$$

According to commutative law

$$= (Z \wedge (W \vee \sim W)) \vee (\sim Z \wedge W)$$

According to Distributive law

$$= (Z \wedge T) \vee (\sim Z \wedge W)$$

According to complement law

$$= Z \vee (\sim Z \wedge W)$$

According to Identity law

$$= (Z \vee \sim Z) \wedge (Z \vee W)$$

According to Distributive law

$$= T \wedge (Z \vee W)$$

According to complement law

$$= (Z \vee W) \wedge T$$

According to commutative law

$$= \boxed{Z \vee W} \quad \text{Identity Law.}$$

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P	q	$\sim P$	$\sim P \wedge q$
T	T	F	F
T	T	F	F
T	F	F	F
T	F	F	F
F	T	T	T
F	T	T	T
F	F	T	F
F	F	T	F

This is Left Side

So the Right side last column & Left side last column is same. Both are equal therefore

$$\sim((P \vee \sim q) \vee (\sim(P \vee \sim q))) \equiv \sim P \wedge q$$

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(Q No(5) Answer)

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P	q	$\sim q$	$\neg p$	$P \vee \sim q$	$\neg(P \vee \sim q)$	$(P \vee \sim q) \vee (\neg(P \vee \sim q))$	$\sim((P \vee \sim q) \vee (\neg(P \vee \sim q)))$
T	T	F	T	T	T	T	F
T	T	F	F	T	F	T	F
T	F	T	T	T	T	T	F
T	F	T	F	T	F	T	F
F	T	F	T	F	F	F	T
F	T	F	F	F	F	F	T
F	F	T	T	T	T	T	F
F	F	T	F	T	F	T	F

This is Right Side

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C) $P \wedge (q \vee r)$

P	q	r	$q \vee r$	$P \wedge (q \vee r)$
T	T	T	T	T
T	F	T	T	T
F	T	T	T	F
F	F	T	T	F

D)

P	q	r	$(P \wedge q)$	$(P \wedge q) \vee r$
T	T	T	T	T
T	T	F	T	T
T	F	T	F	T
T	F	F	F	F
F	T	T	F	T
F	T	F	F	F
F	F	T	F	T
F	F	F	F	F

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Q No. 4

Answer

(a) $\sim p \vee \sim q$

p	q	$\sim p$	$\sim q$	$\sim p \vee \sim q$
T	T	F	F	F
T	F	F	T	T
F	T	T	F	T
F	F	T	T	T

~~~~~X~~~~~X~~~~~

(B)  $q \wedge (\sim p \vee q)$

| $p$ | $q$ | $\sim p$ | $\sim p \vee q$ | $q \wedge (\sim p \vee q)$ |
|-----|-----|----------|-----------------|----------------------------|
| T   | T   | F        | T               | T                          |
| T   | F   | F        | F               | F                          |
| F   | T   | T        | T               | F                          |
| F   | F   | T        | T               | F                          |

~~~~~X~~~~~X~~~~~

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Q No (3)

Answer

In A Part the ~~diff~~ definition correspond to the Proposition $\sim P$ is

a) "Everybody dislikes maths"

In Part B the definition correspond to the Proposition ~~to be~~ $\sim P$ is

a) "Neither 2 nor 3 is the answer"

b) "The answer is not 2
& it is not 3"

In C Part the definition correspond to the Proposition $\sim P$ is

a) "Someone in my class is short or fat."

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Q No(2)

Answer

Right answer is (d) $p \vee q$
 $x < 50$ or $x > 40$. This is true
for all values of x .

x x

Q No(1)

Answer

B and C are proposition