

Course Name: Discrete Structure.

Semester: 2nd

Section: A'

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Question 01:

Answer:

B and C are preposition.

Question 02:

Answer:

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

question 03:

Answers:

In part A the definition correspond to the ~~correspondence~~ proposition is,

b) "Every body dislikes Maths."

In part B the definition correspond to the proposition $\neg P$ is,

a) "Neither 2 nor 3 is the answer"

c) "The answer is not 2 and it is not 3."

In part C the definition correspond to the proposition $\neg P$ is,

c) "Someone in my class is short or fat"

Question 04:

a) $\neg P \vee \sim Q$

Answer:

| P | Q | $\neg P$ | $\sim Q$ | $\neg P \vee \sim Q$ |
|---|---|----------|----------|----------------------|
| T | T | F | F | F |
| T | F | F | T | T |
| F | T | T | F | T |
| F | F | T | T | T |

B) $Q \wedge (\neg P \vee Q)$

| P | Q | $\neg P$ | $\neg P \vee Q$ | $Q \wedge (\neg P \vee Q)$ |
|---|---|----------|-----------------|----------------------------|
| T | T | F | T | T |
| T | F | F | F | F |
| F | T | T | T | F |
| F | F | T | T | F |

c) $p \wedge (q \vee r)$

| P | q | r | $p \wedge$ | $(q \vee r)$ |
|---|---|---|------------|--------------|
| T | T | T | T | T |
| T | T | F | T | T |
| T | F | T | T | T |
| T | F | F | F | F |
| F | T | T | F | T |
| F | T | F | F | T |
| F | F | T | F | T |
| F | F | F | F | F |
| | | | (2) | (1) |
| | | | output | |

d) $(p \wedge q) \vee r$

| P | q | r | $(p \wedge q)$ | $\vee r$ |
|---|---|---|----------------|----------|
| 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 |
| | | | (1) | (2) |
| | | | output | |

Question 05:

Answer:

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

This is right side.

Question 06:

Answer:

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

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

According to Commutative Law.

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

According to Distributive Law.

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

According to Complement Law.

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

According to Identity Law.

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

According to Distributive Law.

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

According to Complement Law.

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

According to commutative Law.

$$= Z \vee W$$

Identity Law.