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Subject :. Discrete Strature

Program :. Softwore. ENG

SubMitted :. Sir Ibrar

Smesler :. 2nd

Sir Ibrar

Q:1:

Which of the following proposition.. ?

(a) :- By Premium Bonds !
it is not proposition

(b):- The Apple Macintosh is a 16 bit Computer
it is proposition

(C) There is a largest even number.
it is proposition

(D) Why are we here ?
it is not proposition ..

(e) $8+7 = 13$
it is proposition

(f) $a+b = 13$
it is not proposition

sler : 2nd

Q2 p is "x < 50"; q is "x > 40"

write As Simply as you Can:

(a) :- $\neg p$

(b) :- $\neg q$

(c) :- $p \wedge q$ ✓

(d) :- $p \vee q$

(e) :- $p \vee q$

(f) :- $p \wedge q$

C is Correct Option

* ═══ *

Q :- "3"

In each part of this question a proposition p is defined which of the statements that following the definition correspond to the proposition -p ? (there may be more then one correct answer)

(A)

P is "Some people like Maths".

(a) "Some people dislike Maths"

(b) "everybody dislikes Maths"

(c) "everybody like Maths"

A is the correct Option

..B"

P is "the answer is either 2 or 3"

(a) "Neither 2 nor 3 is the answer"
(b) ✓ "The answer is not 2 or it is not 3"
(c) "The answer is not 2 and it is not 3"

B is the correct Option

..C"

P is "All people in my class are tall and thin"

(a) "Someone in my class is short & fat"
(b) "No one in my class is tall and thin"
(c) ✓ "Someone in my class is short or fat"

C is the correct Option

Q "4"

Correct the truth tables for

a) $\neg P \vee \neg q$

b) $q \wedge (\neg P \vee q)$

(c) $P \wedge (q \vee 1)$

(d) $(P \wedge q) \vee 1$

Truth table

$\neg P \wedge \neg q$

P	q	$\neg P$	$\neg q$	$\neg P \vee \neg q$
T	T	F	F	F
T	F	F	T	T
F	T	T	F	T
F	F	T	T	T

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

p	q	~p	(~p ∨ q)	q ∧ (~p ∨ q)
T	F	F	T	T
T	F	F	F	F
F	T	T	T	T
F	T	T	T	T

$P \wedge (q \vee r)$

P	q	r	(q ∨ r)	P ∧ (q ∨ r)
T	T	T	T	T
T	F	T	T	T
T	T	F	T	T
T	F	F	F	F
F	F	T	T	F
F	T	F	T	F
F	T	T	T	F
F	F	F	F	

$(p \wedge q) \vee r$

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

Q "5"

use truth table to show that

$\neg((p \vee \neg q) \vee (\forall \wedge (p \vee \neg q))) \equiv \neg p \wedge q$

p	q	$\neg q$	$\neg p$	$\forall$	$(p \vee \neg q)$	$\forall \wedge (p \vee \neg q)$	$(p \vee \neg q) \vee (\forall \wedge (p \vee \neg q))$	$\neg((p \vee \neg q) \vee (\forall \wedge (p \vee \neg q)))$	$\neg p \wedge q$
T	T	F	F	F	T	T	T	F	F
T	F	T	F	F	T	T	T	F	F
F	T	F	T	F	F	F	F	T	T
F	F	T	T	T	T	T	T	F	F

Hence it is proved that

$\neg((p \vee \neg q) \vee (\forall \wedge (p \vee \neg q))) \equiv \neg p \wedge q$

Q"6"

Use The laws of logical proposition to prove that

$(z \wedge w) \vee (-z w) \vee (z \wedge \neg w) \equiv z \vee w$

State Casefully which law you are using at each tage

Ans $(z \wedge w) \vee (-z \wedge w) \vee (z \wedge -w) \cdot (z \wedge w) \vee (z \wedge w) \vee (-z w)$

(Comunitative law)

$= (z \wedge (w \vee -w) \vee (-z w)$

Distributive law

$= (z \wedge T) \vee (-z \wedge w)$

Complement law

$= z \vee (-z \wedge w)$

identity law

P.T.O

$= (z \vee \neg z) \wedge (z \vee w)$

Distributive law

$= T \wedge (z \vee w)$

Complement law

$= (z \vee w) \wedge T$

Commutative law

$= z \vee w$

Identity law