Abbas Khan

BS Software Engineering

Section: A

2nd Samester

I.D (16049)

Ans 1)

B) The apple Macintosh is a 16-bit computer.
C) There is a Largest Even Number.
E) 8 + 7 = 13

……………………………………………………………………………

Ans 2)

D) $p \lor q$.

……………………………………………………………………………

Ans 3)

a) (a) “Some people dislike Math’s.”
b) (a) “Neither 2 nor 3 is the answer.”
c) “No one in my class is tall and thin.”

……………………………………………………………………………

Ans 4)

a) $\neg p \lor \neg q$

P	Q	¬p	¬q	¬p∨¬q
T	T	F	F	F
T	F	F	T	T
F	T	T	F	T
F	F	T	T	T

b). q ∧ (¬p ∨ q)

P	Q	¬p	¬p ∨ q	q ∧ (¬p ∨ q)
T	T	F	T	T
T	F	F	F	F
F	T	T	T	T
F	F	T	T	F

c).P ∧ (q∨ r).

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

d).(p ∧ q) ∨ r

P	Q	R	p ∧ q	(p ∧ q) ∨ r
T	T	T	T	T
T	F	T	F	T
F	T	F	F	F
F	F	F	F	F

………………………………………………………………………………

Ans 5)

Solution:

First construct truth table of LHS i.e. ¬ ((p ∨ ¬q) ∨ (r ∧ (p ∨ ¬q)))

R	P	q	¬q	p ∨ ¬q	r ∧ (p ∨ ¬q)	((p∨ ¬q) ∨ (r ∧ (p ∨ ¬q)))	¬ ((p ∨ ¬q) ∨ (r ∧ (p ∨ ¬q)))
T	T	T	F	T	T	T	F
F	T	F	T	T	F	T	F
T	F	T	F	F	F	F	T
F	F	F	T	T	F	T	F

Now we construct truth table of RHS i.e ¬p∧ q

P	Q	¬p	¬p∧ q
T	T	F	F
T	F	F	F
F	T	T	T
F	F	T	F

From Both the truth table we see that:

¬ ((p ∨ ¬q) ∨ (r ∧ (p ∨ ¬q)))≡ ¬p ∧ q.

………………………………………………………………………………

Ans 6)

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

So taking from LHS

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

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

$= (z \wedge T) \vee (\neg z \wedge w)$ Complement law

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

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

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

$= (z \vee w)\ T$ Commutative law

$= z \vee w$ Identity law

Its proved that

LHS=RHS

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