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class: 12th sub: Maths-1.

Date: 17/07/21 chapter: Logic.

Test No: 3

Q.1

1. P: Surat is in Gujarat = T
q: 3+7 = 10. = T.
S.F: P ∨ q
T.V: T.

2. P: If 2>1, = T
q: 5+2 = 3 = T
S.F = P → q
T.V = T.

3. P: 27/3 = 9 = T
q: 15-12 = 3 = T
S.F: P ∧ q
T.V: T.

4. P: 5+7 = 10 It is not true = T
q: 3+5 = 8 = T
S.F: P ∨ q
T.V: T.

Q.2 $p = T$, $q = F$, $r = F$

1. $(r \vee p) \rightarrow (\sim q)$

→ $(F \vee T) \rightarrow (\sim F)$

$T \rightarrow T$

∴ Truth value = T.

2. $(r \vee p) \leftrightarrow q$.

→ $(F \vee T) \leftrightarrow F$

$T \leftrightarrow F$

∴ Truth value = F.

3. $(p \vee q) \wedge (q \rightarrow r)$

→ $(T \vee F) \wedge (F \rightarrow F)$

$T \wedge T$

∴ Truth value = T.

Q.3

1. $(\sim p \vee \sim q) \leftrightarrow [\sim(p \wedge q)]$.

→ p	q	~p	~q	~p ∨ ~q	p ∧ q	~p ∧ q	(~p ∨ ~q) ↔ [~(p ∧ q)]
T	T	F	F	F	T	F	T
T	F	F	T	T	F	T	T
F	T	T	F	T	F	T	T
F	F	T	T	T	F	T	T

2. ~~$\sim(p \wedge q) \vee r$~~

$[(p \wedge q) \vee r] \wedge [\sim r \vee (p \wedge q)]$

p	q	r	$\sim r$	$p \wedge q$	$(p \wedge q) \vee r$	$(\sim r) \vee (p \wedge q)$	$[(p \wedge q) \vee r] \wedge [\sim r \vee (p \wedge q)]$
T	T	T	F	T	T	T	T
T	T	F	T	T	T	T	T
T	F	T	F	F	T	T	T
T	F	F	T	F	F	T	F
F	T	T	F	F	T	T	T
F	T	F	T	F	F	T	F
F	F	T	F	F	T	T	T
F	F	F	T	F	F	T	F

Q.4

1. $p \leftrightarrow q \equiv \sim(p \wedge \sim q) \wedge \sim(q \wedge \sim p)$

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
p	q	$p \leftrightarrow q$	$\sim p$	$\sim q$	$(p \wedge \sim q)$	$\sim p \wedge \sim q$	$q \wedge \sim p$	$\sim q \wedge \sim p$	$\sim(p \wedge \sim q) \wedge \sim(q \wedge \sim p)$
T	T	T	F	F	F	T	F	T	T
T	F	F	F	T	T	F	F	T	F
F	T	F	T	F	F	T	T	F	F
F	F	T	T	T	F	T	F	T	T

From the above T.T, we observe that col^n. no. 3 and 10 having identical entries.

∴ The given S.P is equivalent to each other.

$p \leftrightarrow q \equiv \sim(p \wedge \sim q) \wedge \sim(q \wedge \sim p)$

2. $\sim(p \vee q) \vee (\sim p \wedge q) \equiv \sim p$

① p	② q	③ $\sim p$	④ $p \vee q$	⑤ $\sim p \vee q$	⑥ $\sim p \wedge q$	⑦ $\sim p \wedge q$	⑧ $\sim(p \vee q) \vee (\sim p \wedge q)$
T	T	F	T	F	T	F	F
T	F	F	T	F	F	F	F
F	T	T	T	F	F	T	T
F	F	T	F	T	F	F	T

From the above T.T, we observe that col no. 3 and 8 having identical entities.

∴ The given S.P is equivalent to each other

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

Q.5

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

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

2. $\sim(p \vee q) \vee (\sim p \wedge q) \equiv \sim p$

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

3. $(p \wedge \sim q \wedge r) \vee [p \wedge (\sim q \vee \sim r)]$

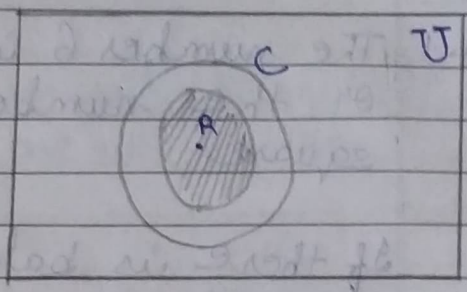
→ $(p \vee \sim q \vee r) \wedge [p \vee (\sim q \wedge \sim r)]$

4. $(p \to q) \vee (q \to p)$

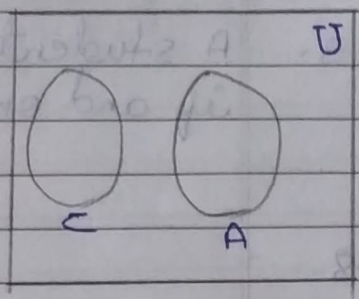
→ $(p \to q) \wedge (q \to p)$.

Q.6.

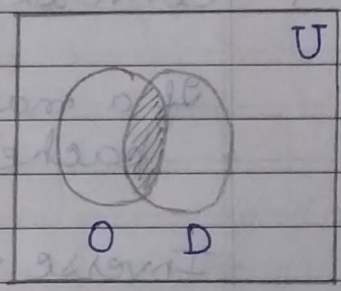
1. U = Set of Numbers
R = Set of real No.
C = Set of complex No.



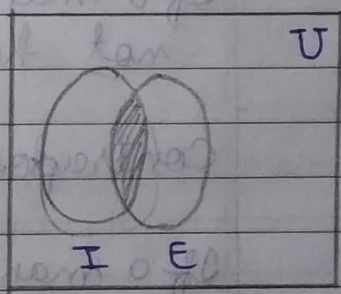
2. U = Set of Human Being
C = Set of child
A = Set of an Adult.



3. U = Set of Numbers.
O = Set of odd-Numbers.
D = Divisible by 5.



4. U = Set of Triangle
I = Set of Isosceles Triangle
E = Set of equilateral Triangle.



Q.7

1. The number 6 is not an even number or the number 25 is not a perfect square.

2. If there is balance in Yusuf's account then Yusuf can withdraw amount.

3. A student will not get a seat for M.B.A if and only if he is not rich.

Q.8

1. Converse:

If a man is happy then he is a bachelor.

Inverse:

If a man is not a bachelor then he is not happy.

Contrapositive:

If a man is not happy then he is not a bachelor.

2. Converse:

If areas of two triangles are equal then they are congruent.

Inverse :

If two triangles are not congruent then their areas are not equal.

Contrapositive :

If areas of two triangles are not equal then they are not congruent.