DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : MATHS
DPP NO. :2

Topic :-MATHEMATICAL REASONING

2 **(c)**
$(\sim p \wedge q) \wedge \sim q = \sim p \wedge (q \wedge \sim q) = \sim p \wedge c = c$

3 **(c)**
$p \wedge q$ means Mathematics is interesting and Mathematics is difficult

4 **(a)**
Truth Table

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

Hence, $(p \wedge \sim r) \rightarrow (\sim p \vee q)$ is F.
When $p = \text{T}, q = \text{F}, r = \text{F}$

6 **(a)**
By truth table

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

It is clear that $(p \vee q) \vee \sim p$ is a tautology

7 **(a)**
Let p: Two triangles are identical
q: Two triangles are similar
Clearly, the given statement in symbolic form is $p \rightarrow q$.
$\therefore$ Its contrapositive is given by $\sim q \rightarrow \sim p$.
ie, If two triangles are not similar, then these are not identical.

8 **(a)**
$(p \vee q) \wedge (p \vee r) = p \vee (q \wedge r)$

9 **(c)**
Truth table

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

It is clear from the table that last column have all true values. Hence option (c) is correct

10 **(b)**

Let $p = 2$ is prime
and $q = 3$ is odd
Given, $p \to q$
Negation of $p \to q$ is $\sim (p \to q)$
$\Rightarrow \quad p \wedge \sim q$
$\Rightarrow$ 2 is prime and 3 is not odd.

11 **(a)**

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

12 **(a)**

Since, switches a and b and a', b' and c' are parallel which is denoted by $a \wedge b$ and $a' \wedge b' \wedge c'$ respectively
Now, $(a \wedge b), c$ and $(a' \wedge b' \wedge c')$ are connected in series, then switching function of complete network is
$(a \wedge b) \vee c \vee (a' \wedge b' \wedge c')$

13 **(b)**

The negation of $q \vee \sim (p \wedge r)$ is given by
$\sim \{q \vee \sim (p \wedge r)\} \cong \sim q \wedge (p \wedge r)$

15 **(d)**

$(\sim p \wedge q) \vee \sim q \equiv \sim q \vee (\sim p \wedge q)$ (By Commutative law)
$\equiv \sim q \vee (q \wedge q \sim p)$ (By Commutative law)
$\equiv \sim q \vee q(\sim q \vee \sim p)$ (By Distributive law)
$\equiv \sim (q \wedge p)$
$\equiv \sim (p \wedge q)$

16 **(b)**

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

F F	T F	F F	T T	T T	T T	F F

It is clear from the table that
$\sim[(p \wedge q) \rightarrow (\sim p \vee q)]$
is a contradiction.

19 **(c)**

Plants are living objects is not a statement.

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	D	C	C	A	B	A	A	A	C	B
Q.	11	12	13	14	15	16	17	18	19	20
A.	A	A	B	A	D	B	C	A	C	A