.:: MTH202 – Discrete Mathematics ::.

Assignment No.1

Q-1: Show that $\sim (p \vee (\sim p \wedge q)) \equiv \sim p \wedge \sim q$ **by using laws of logic.**

Marks=5

SOLUTION:

~ P Λ (~ (~P Λ Q))

~ P Λ (P v ~Q)

(~ P Λ P) v (~P Λ ~Q)

c v (~P Λ ~Q)

~ P Λ ~Q

So, it is proved by above solution that $\sim (p \vee (\sim p \wedge q)) \equiv \sim p \wedge \sim q$

Q#02: Determine whether the following is a tautology, a contingency or an absurdity.

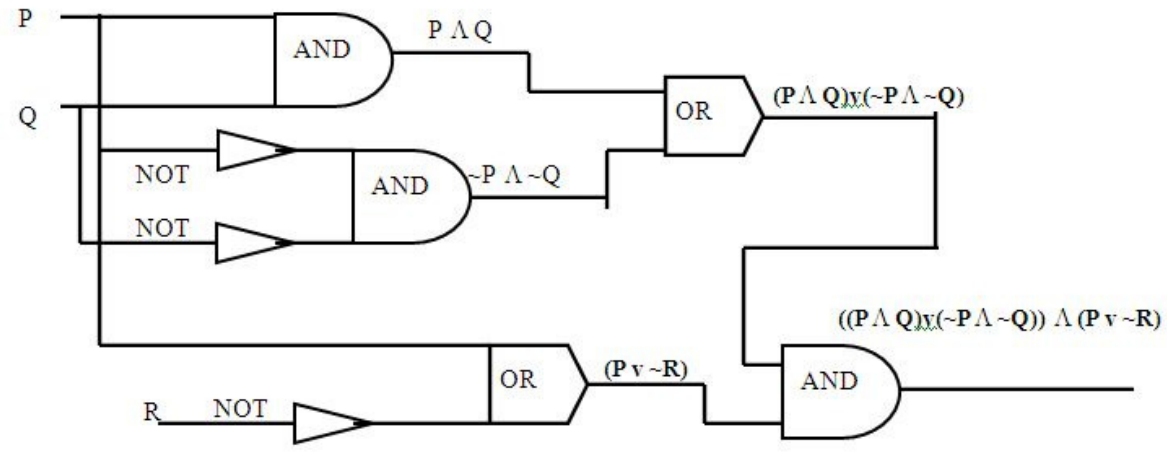
$p \rightarrow (q \rightarrow p)$ www.vchowk.com **Marks=5**

SOLUTION:

The Truth Table is given below of the given statement,

P	Q	R	~P	~Q	~R	P Λ Q	P v ~R	~P Λ ~Q	(P Λ Q)v(~P Λ ~Q)	((P Λ Q)v(~P Λ ~Q)) Λ (P v ~R)
T	T	T	F	F	F	T	T	F	T	T
T	T	F	F	F	T	T	T	F	T	T
T	F	T	F	T	F	F	T	F	F	F
T	F	F	F	T	T	F	T	F	F	F
F	T	T	T	F	F	F	F	F	F	F
F	T	F	T	F	T	F	F	F	F	F
F	F	T	T	T	F	F	F	T	T	F
F	F	F	T	T	T	F	F	T	T	F

LOGICAL CIRCUIT OF THE ABOVE MENTION TRUTH TABLE IS GIVEN BELOW



Q#03: If U={0,1,2,3,4,5,6,7,8,9}, A={1,2,4,6,8} and B={x| x is a positive integer and x2≤16}

then find Ac ∩ B

Marks=5

SOLUTION:

z	A^c	B	$A^c \cap B$	A U B	$(A^c \cap B)^c$	$(A^c \cap B)^c \cap (A \cup B)$
1	0	1	0	1	1	**1**
1	0	0	0	1	1	**1**
0	1	1	1	1	0	**0**
0	1	0	0	0	1	**0**

It is proved by the above mentioned truth table that the values of column A are the same values of column **(A^c ∩ B)^c ∩ (A U B)** so, it is proved that $(A^c \cap B)^c \cap (A \cup B) = A$