Question 1.  The Boolean Expression (p ∧ ~q) ∨ q ∨( ~p ∧ q) is equivalent to _____.

**Question 2:**

Consider the following statements

P: Suman is brilliant

Q: Suman is rich

R: Suman is honest

The negation of the statement: Suman is brilliant and dishonest if and only if Suman is rich?? can be expressed as

**Question 3:** What is the negation of the compound proposition?

If the examination is difficult, then I shall pass if I study hard.

**Question 4:** The statement p → (p → q) is equivalent to _____.

**Solution (1 ):**

[(p ∧ ~q) ∨ q] ∨ (~p ∧ q) = (p ∨ q) ∧ (~q ∨ q) ∨ (~p ∧ q)
= (p ∨ q) ∧ [t ∨ (~p ∧ q)]

= (p ∨ q) ∧ t

= p ∨ q


**Solution( 2):**

Suman is brilliant and dishonest is P∧~R.

Suman is brilliant and dishonest if and only if Suman is rich is Q ↔ (P ∧ ~R)

Negative of the statement is expressed as ~(Q ↔ (P ∧ ~R).


**Solution(3):**

If p: Examination is difficult

q: I shall pass

r: I study hard

Given result is P ⇒ (r ⇒ q)

Now, ~ (r ⇒ q) = r ∧ ~q ~(p ⇒ (r ⇒ q)) = p ∧ (r ∧ ~q)

The examination is difficult and I study hard but I shall not pass.


**Solution(4):**

p → (q → p) = −p (q → p) = ~p ∨ (~q ∨ p)

(Since p ∨ ~p is always true) = ~p ∨ p ∨ q = p → (p ∨ q)