Assignment Questions

1> Define logical equivalence.

Prove that for any 3 propositions p, q, r

$$[(p \vee q) \to r] \Leftrightarrow [(p \to r) \wedge (q \to r)]$$

2> P.T $[(\sim p \vee \sim q) \to (p \wedge q \wedge r)] \Leftrightarrow p \wedge q$

3) Test wheather the following are valid argument.

If I study, I will not fail, in the examination.

If I do not watch TV in the evenings, I will study.

I failed in the examination

$\therefore$ I must have watched TV in the evenings.

4> Check wheather the statements are valid or not.

$$p \to (q \to r)$$
$$p \vee \sim s$$
$$\cdot q$$
$$\overline{\therefore s \to r.}$$

5> For the universe of all integers,

Let $p(x): x > 0$

$q(x): x$ is even

$r(x):$ x is a perfect square

$s(x):$ x is divisible by 3

$t(x):$ x is divisible by 7.

Write down the following quantified statements in the symbolic form.

(i) At least, one integer is even.

(ii) There exists a positive integer that is even.

(iii) Some even integers are divisible by 3.

(iv) Every integer is either even (or) odd.

(v) If x is even and a perfect square, then x is not divisible by 3.

(vi) If x is odd (or) is not divisible by 7, then x is divisible by 3.