Assignment No. 7

(1) The voltage and current through a circuit element are $v(t) = 100 \sin(314t + 45^\circ)$ volts.
$i(t) = 10 \sin(314t + 315^\circ)$ amps.
Identify the circuit element, Draw the phasor & wave diagram, Find the values of circuit elements, obtain the expression of instantaneous power and calculate average power.

(2) An R-L series circuit connected across a voltage source $v(t) = 283 \sin 314t$. The expression of current in the circuit is found to be $i(t) = 4 \sin(314t - 45^\circ)$ Find the value of R, L and power factor.

(3) For an ac circuit the voltage & current expressions are : $v(t) = 200 \sin(377t)$ volts.
$i(t) = 8 \sin(377t - 30^\circ)$ amps.
Determine the power factor, true power, apparent power and reactive power of the circuit. Validate it through power triangle.

(4) A 100V, 60W bulb is to be operated from 220V supply. What resistance must be connected in series with the bulb to glow normally ?

(5) Voltage, $v(t) = \sqrt{2} \times 100 \cos 500t$, Active Power, $P = 250$ W power factor $\cos\phi = 0.7$ lagging. Calculate the reactive power of the system.

(6) A voltage $v(t) = 150 \sin(2\pi ft)$, 50Hz is applied to series circuit consisting of 10 Ω resistance, 0.0318 H inductance. Determine (i) the expression of current $i(t)$ (ii) phase angle between voltage and current (iii) power factor (iv) Active power consumed.