Q- In the simple AC Circuit R=70.0 Ohm and $V = V_{max} \sin \omega t$
a) If $V_t = 0.250\ V_{max}$ for the first time at t = 0.0100 s, what is the angular frequency of the source?
b) What is the next value of t for which $V_t = 0.250\ V_{max}$?

a) The voltage across the resistance is given by

$$V = V_{max} \sin \omega t$$

Here the voltage is changing as a sine function of time and at time t = 0.0100 s the voltage is $0.250\ V_{max}$ hence substituting the values in the equation above equation we have

$$0.250\ V_{max} = V_{max} \sin (\omega * 0.0100)$$

Or $\sin (\omega * 0.0100) = 0.250$

Or $\omega * 0.0100 = \sin^{-1}(0.250) = 14.48^0 * \frac{\pi}{180^0} = 0.2527$ radians

Gives ω = 25.27 radians/sec.

Hence the angular frequency of the source is 25.27radians/sec

b) What is the next value of t for which $V_t = 0.250\ V_{max}$?

The angle ωt is called phase angle and the value of $\sin \theta$ is same as that of $\sin (\pi - \theta)$, the value of $\sin \omega t$ will be repeated again at time t' when the value of $\omega t'$ will be $(\pi - \omega t)$

Or $\omega t' = \pi - \omega t$
Or $t' = (\pi/\omega) - t = 0.1243 - 0.0100 = 0.1143$ s