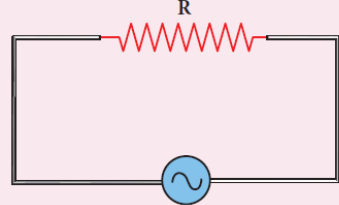
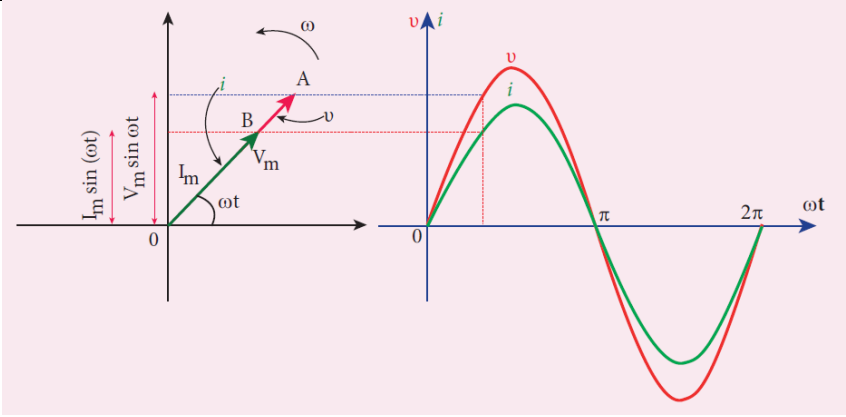
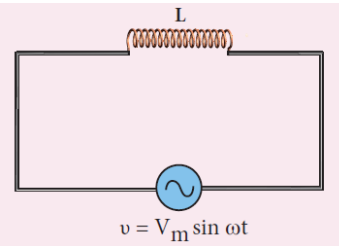
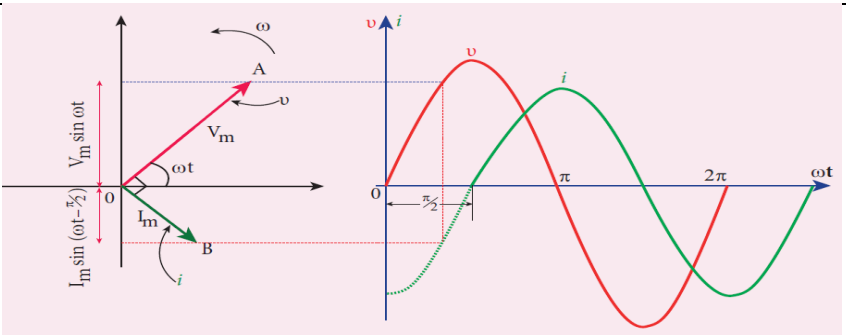
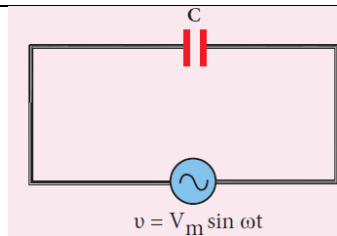


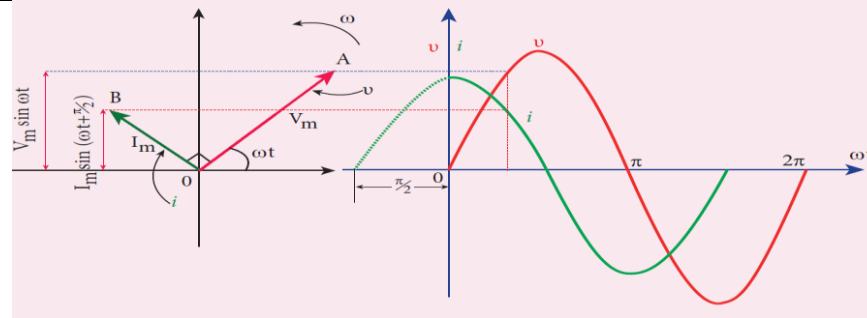
COMPONENTS	CIRCUIT DIAGRAM	DERIVATION	GRAPHICAL REPRESENTATION OF VOLTAGE AND CURRENT AND PHASOR DIAGRAM	AVERAGE POWER
RESISTOR		$V = v_m \sin \omega t$ $V_R = IR$ $V - V_R = 0$ $v_m \sin \omega t - IR = 0$ $v_m \sin \omega t = IR$ $I = v_m \sin \omega t / R$ $I = I_m \sin \omega t$ Compare first and last equations, The phase difference between voltage and current is zero		VI
INDUCTOR		Applied emf is $V = v_m \sin \omega t$. The back emf in the inductor is $\epsilon = -L \frac{di}{dt}$ $V + \epsilon = 0$ $V = v_m \sin \omega t = L \frac{di}{dt}$ $di = \frac{v_m}{L} \sin \omega t dt$ integrate on both sides $i = \frac{v_m}{L\omega} (-\cos \omega t) + \text{constant}$ $-\cos \omega t = -\sin(\frac{\pi}{2} - \omega t) = \sin(\omega t - \pi/2)$		ZERO

Substitute in i.
 $i = \frac{v_m}{L\omega} \sin(\omega t - \pi/2)$
 compare V and I,
 the phase
 difference between
 them is $\frac{\pi}{2}$
 voltage leads the
 current by $\frac{\pi}{2}$

CAPACITOR



$V = v_m \sin \omega t$
 The emf across the
 capacitor $= q/C$
 $V - q/C = 0$
 $q/C = v_m \sin \omega t$
 $q = C V = C v_m \sin \omega t$
 $i = dq/dt = \frac{d(CV = \sin \omega t)}{dt}$
 $= C \omega v_m \cos \omega t$
 Substitute
 $\cos \omega t = \sin(\omega t + \frac{\pi}{2})$
 $I = C \omega v_m \sin(\omega t + \frac{\pi}{2})$
 $= \frac{v_m}{\frac{1}{C\omega}} \sin(\omega t + \pi/2)$
 $= I_m \sin(\omega t + \pi/2)$
 Compare I with V.
 The phase
 difference between
 them is $\pi/2$. That is
 the current is
 leading the voltage
 by $\pi/2$



ZERO

