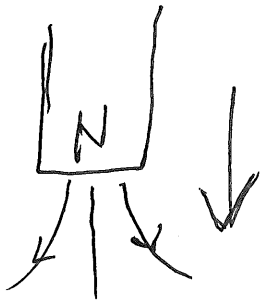
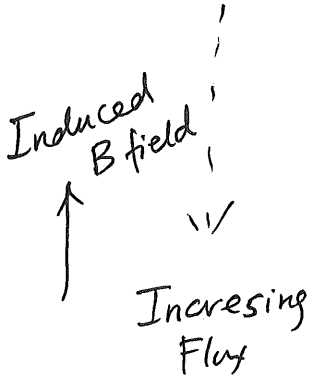
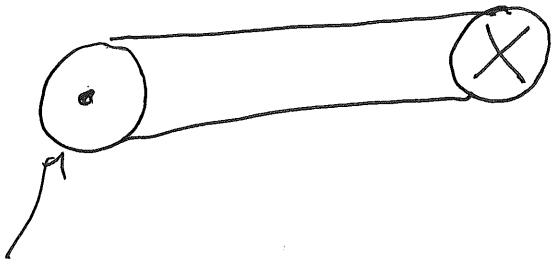
$$\mathcal{E} = -\frac{d\Phi}{dt}$$

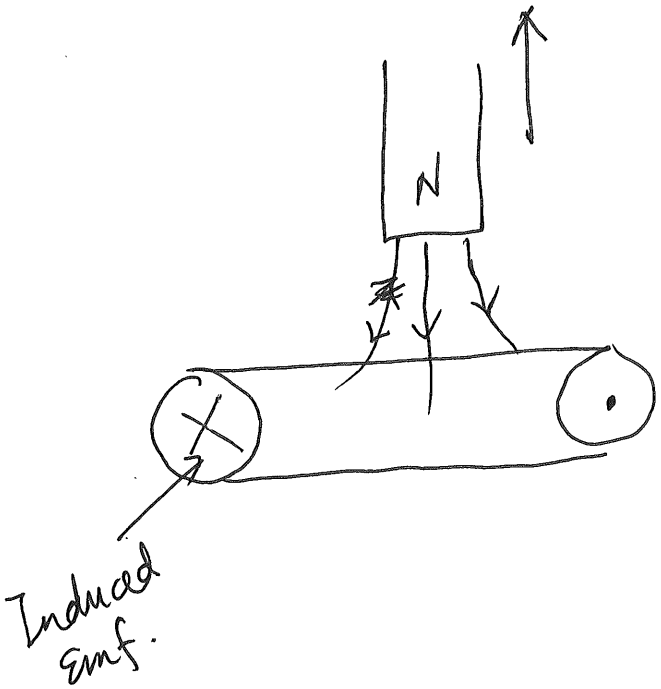
Lenz's law.

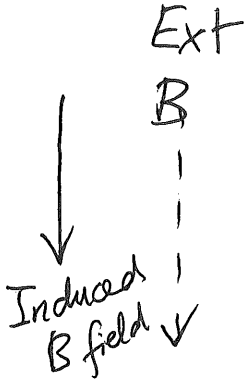


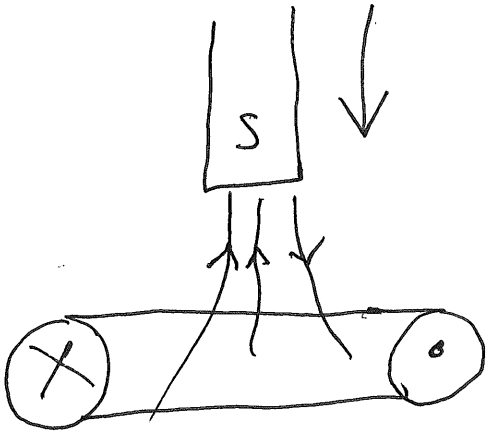


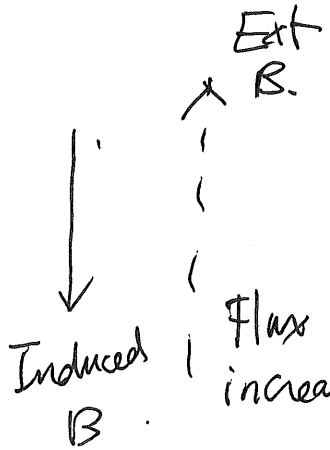


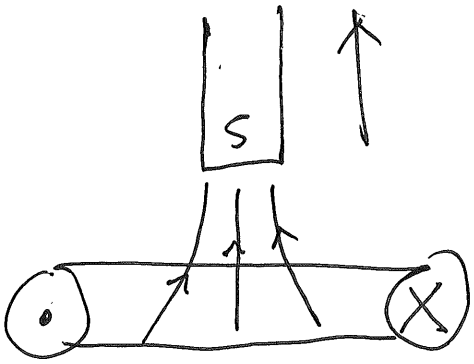
Induced
Emf.

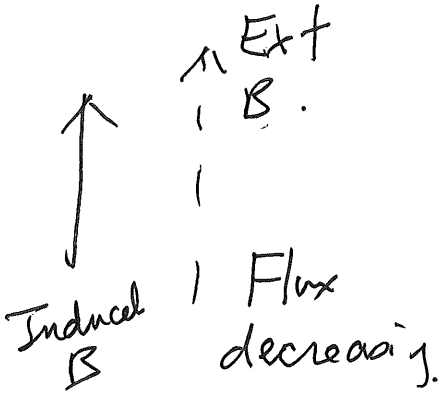

N
Induced
Emf.


Ext
B
Induced
B field
Flux
decreasing.


S


Ext
B.
Induced
B.
Flux
increasing.


S


Ext
B.
Induced
B
Flux
decreasing.

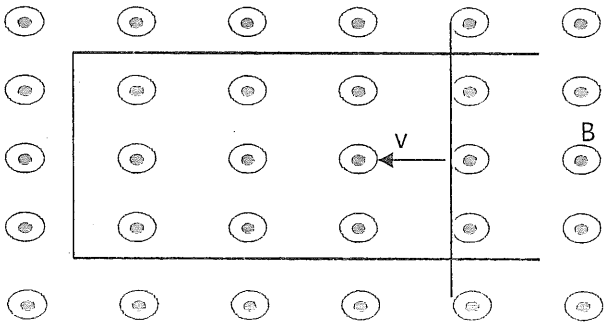
Name: _____

PHY 232 Summer 2016 Class Work

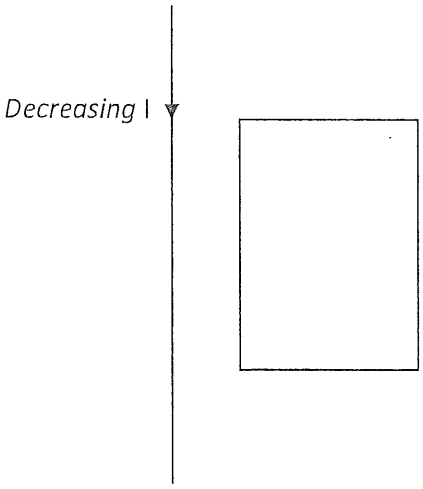
Class 33. Lenz's Law Practice

Indicate the induced emf direction in the following situations, using arrows, ⊙ and ⊗ .

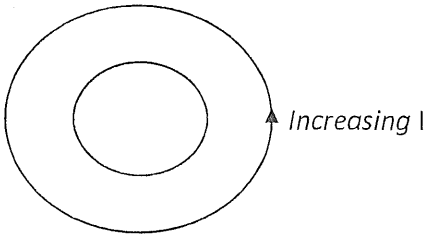
(a)



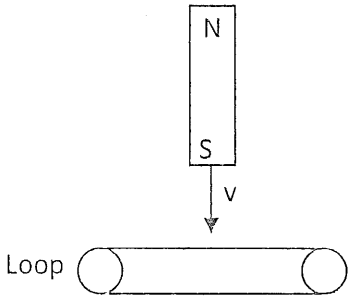
(b)



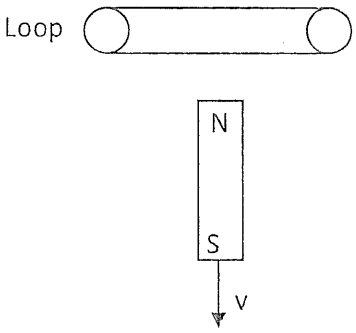
(c)



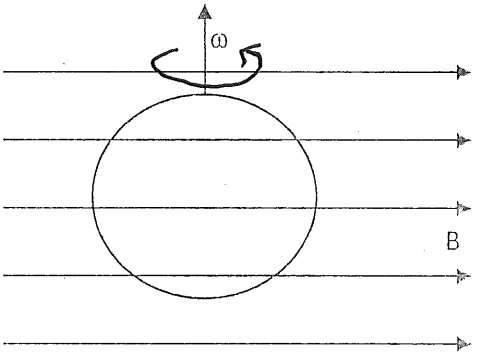
(d)



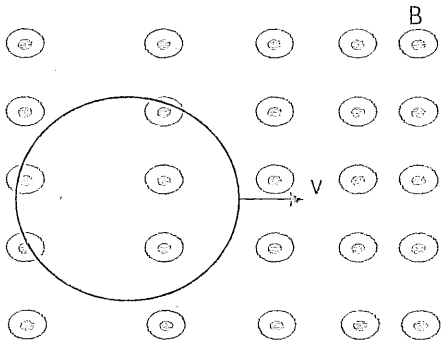
(e)



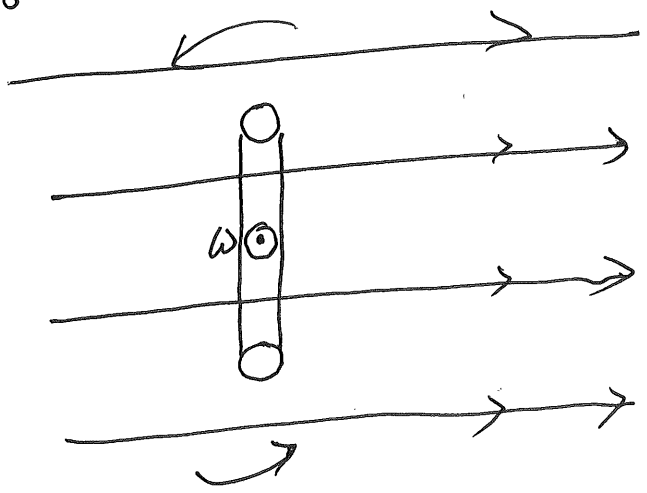
(f)



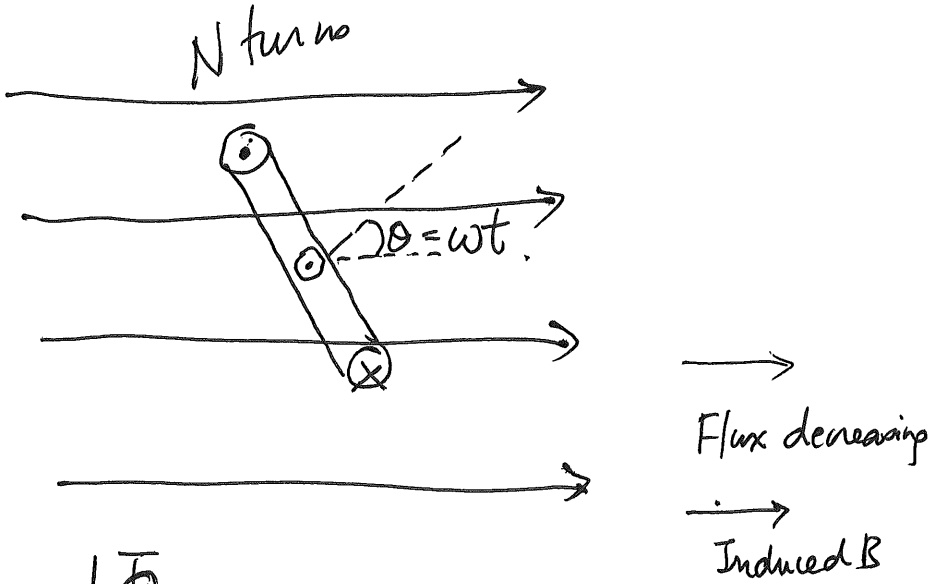
(g)



Initial Condition: At $t=0$. $\theta=0$.



At time t



$$|\mathcal{E}| = \frac{d\Phi}{dt}$$

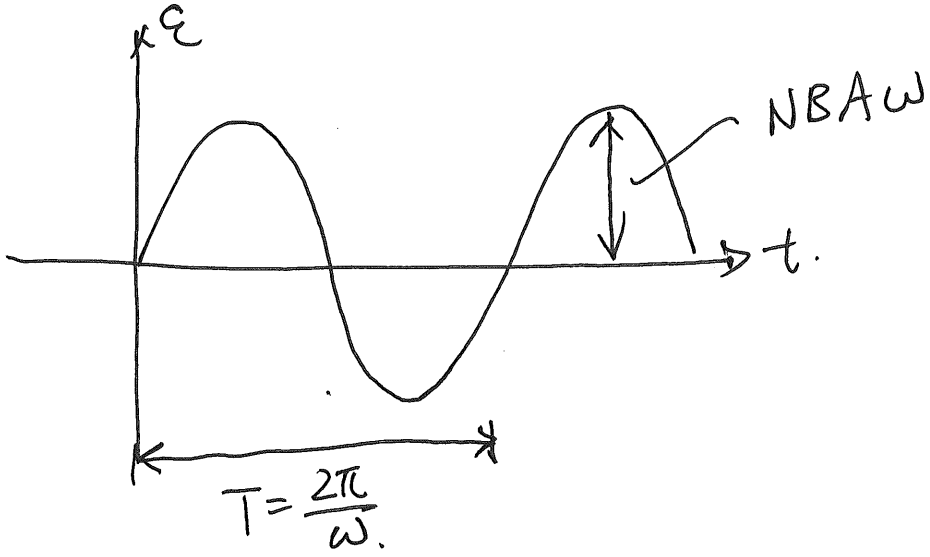
$$= \frac{d}{dt}(NBA\cos\theta).$$

$$= \frac{d}{dt}(NBA\cos\omega t). \quad = NBA\frac{d}{dt}\cos\omega t$$

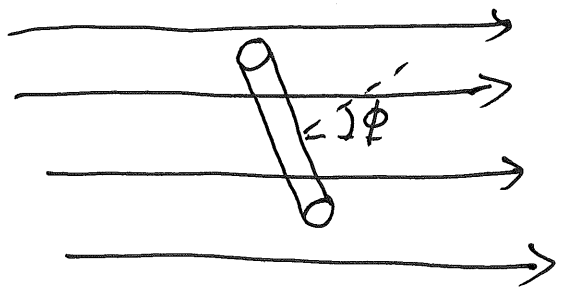
$$= NBA\omega\sin\omega t.$$

In general.

$$\mathcal{E} = NBA\omega \sin \omega t$$



If at $t=0$:



$$\mathcal{E} = NBA\omega \sin(\omega t + \phi).$$

↑ phase angle.