

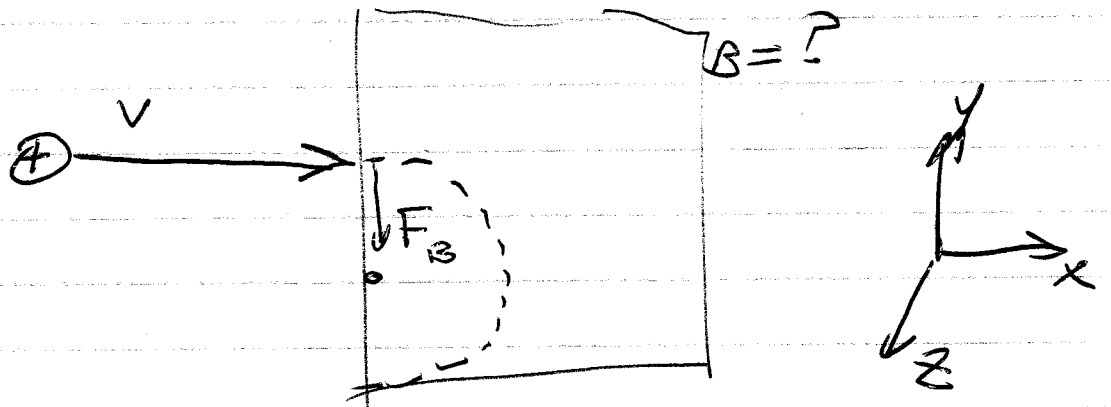


②

Stage 2: Circular motion

$$r = \frac{mv}{qB}$$

$$\text{Force} = qvB \rightarrow \frac{mv^2}{r}$$



What dir is  $B$ ?

$v$  is  $+x$   
 $F$  is  $-y$  }  $B$  is  $+z$

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③

Circuits: • Series RLC AC

• Resonance

Ex:  $C = 1 \mu\text{F}$   $f = 101 \text{ MHz}$

$$f = \frac{1}{2\pi\sqrt{LC}}$$

$$\text{Inductance } L = \frac{1}{(2\pi f)^2 C}$$
$$= 2.5 \times 10^{-12} \text{ H}$$

• DC Series / Parallel

• Cost of Energy      Rate = \$0.12/kWh

$$\text{Cost} = \text{Amount} \cdot \text{Rate}$$

$$\text{Energy} = P \Delta t$$

Ex LED Bulb : 9W vs 60W

1 month = 720h      6.5 kWh      43 kWh

\$0.78      \$5

(4)

$f = \ominus$   
Optics: Diverging - always virtual image

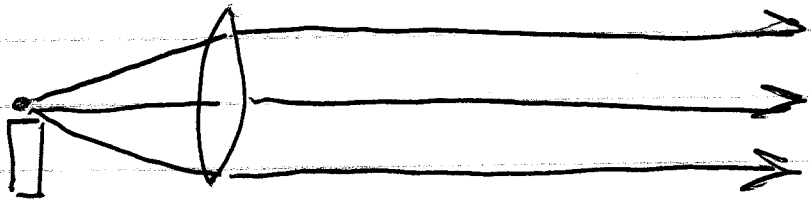
$f$  is  $\oplus$   
Converging - virtual image - mag glass  
- eyepiece  
- corrective lens

- real image - projector  
- telescope/microscope

what if a candle is placed  
at the focal point of a  
converging lens? ( $p = f$ )

$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$$

$$\frac{1}{q} = 0 \quad q = \infty$$



"Spotlight"

5

## Diffraction Grating

$$m \lambda = d \sin \theta$$

Works for Gamma  
X-Rays  
UV  
Visible Light  
IR  
Microwave  
Radio

	Red	Violet
Visible Light	400 - 750 THz	750 - 400 nm

$$\begin{aligned} v &= \frac{c}{\lambda} = (400 \times 10^{12} \text{ Hz}) (750 \times 10^{-9} \text{ m}) \\ &= 3 \times 10^8 \text{ m/s} \end{aligned}$$