

1402 ① Phys 1402 2015-10-01 Lec 11

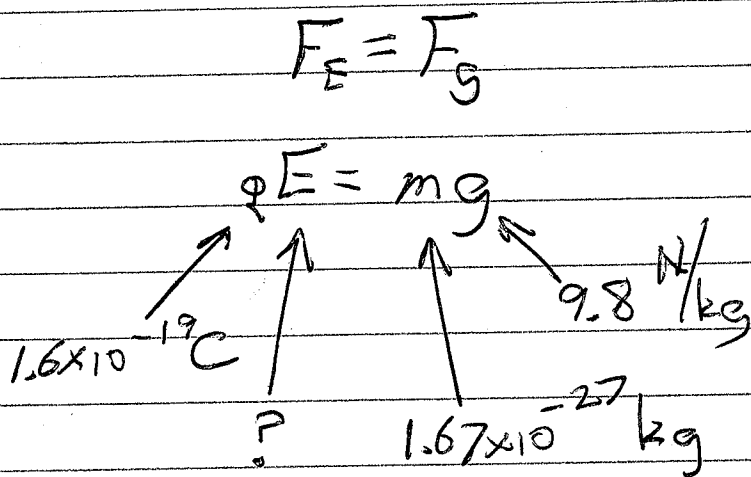
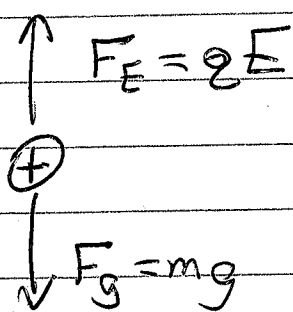
Corrections to Answer/Score Sheet:

- #13: Accepted A or B
- #26: Counts as extra credit, so score is out of 29, not 30.

Average: 64%

My Calendar: tinyurl.com/spirkocal

#19: Supporting the weight of a proton.



#25 7cm x 14cm plate
1mm from table

$$C = \frac{\epsilon_0 A}{d} = (1) \left(8.85 \times 10^{-12} \frac{\text{C}^2}{\text{Nm}} \right) \left(\frac{0.07 \text{ m} \times 0.14 \text{ m}}{0.001 \text{ m}} \right)$$
$$= 8.7 \times 10^{-11} \text{ F}$$
$$= 87 \times 10^{-12} \text{ F}$$
$$= 87 \text{ pF}$$

1402 ②

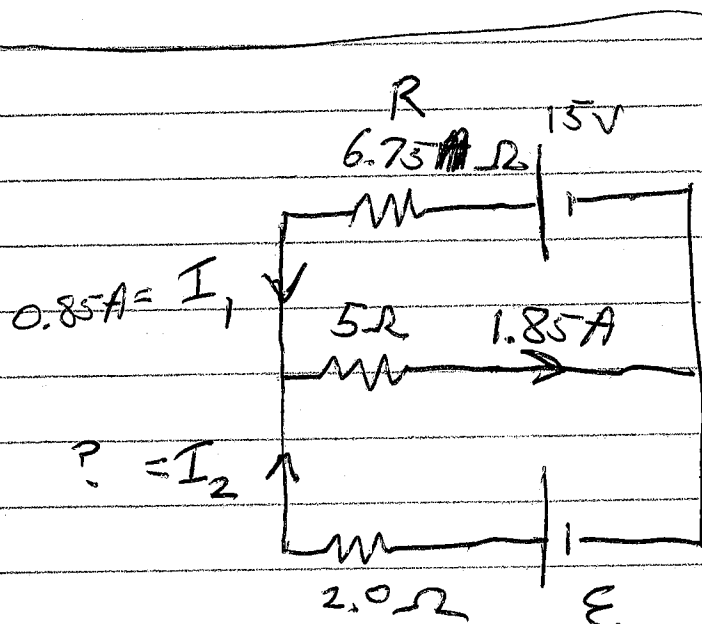
#26 Flux of a proton:

$$\Phi_E = \frac{q}{\epsilon_0} = 4\pi k q$$

$$= 4\pi (9 \times 10^9 \frac{Nm^2}{C^2}) (1.6 \times 10^{-19} C)$$

$$\approx 1.8 \times 10^{-8} \frac{Nm^2}{C}$$

$$\begin{aligned} & \left[\frac{Nm}{C} \cdot m \right] \\ &= \frac{J}{C} \cdot m \\ &= V \cdot m \end{aligned}$$



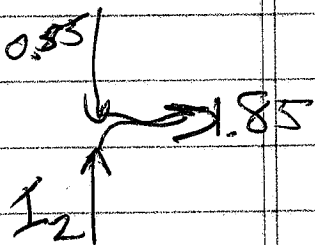
$$\begin{aligned} V_5 &= IR \\ &= (1.85A)(5\Omega) \\ &= 9.25V \end{aligned}$$

$$\begin{aligned} V_R &= 15 - 9.25 \\ &= 5.75V \end{aligned}$$

$$I_1 = \frac{V_R}{R} = \frac{5.75V}{6.75\Omega} = 0.85A$$

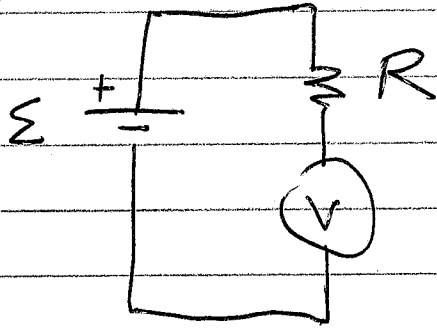
$$I_2 = 1.85 - 0.85 = 1.0A$$

$$\begin{aligned} \mathcal{E} &= V_2 + V_5 \\ &= (2V) + (9.25V) = 11.25V \end{aligned}$$



1402 ③

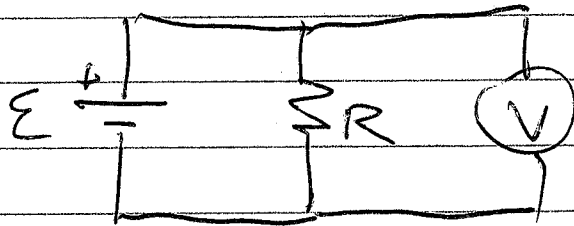
#16



$$\mathcal{E} = \cancel{IR} + V_{\text{meter}}$$

$I = 0$ b/c meter blocks current.

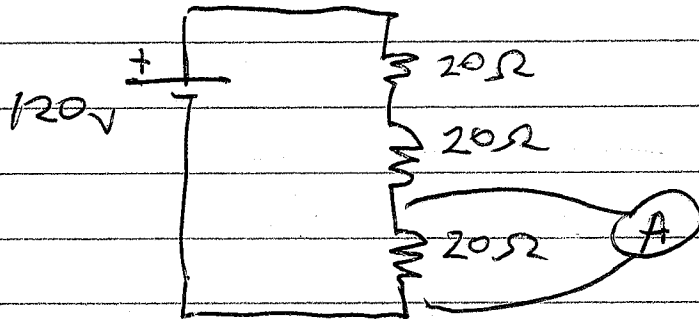
This would be the right hookup:



$$\mathcal{E} = IR$$

$$\mathcal{E} = V_{\text{meter}}$$

What if an ammeter is in parallel?



$$\text{Overall equiv: } R_{\text{eq}} = 40 \Omega$$

$$I = \frac{120 \text{ V}}{40 \Omega} = 3.0 \text{ A}$$

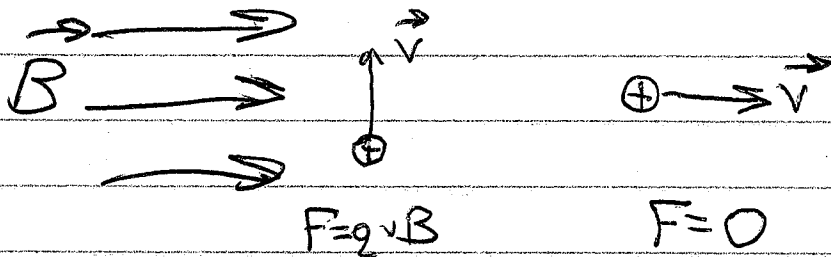
1402 (4)

Magnetism

- Read Chap 19
- Magnetic Fields are real
- What do magnets do?
 - Cause Forces
 - Induce magnetism in other objects
 - Orient other small magnets
 - Generate electricity
 - Generate motion
- Physics effects of magnets
 - Force on a charge

$$F = q \mathbf{v} \times \mathbf{B}$$
$$= q v B_{\perp}$$

- need v
- need perpendicular $v \perp B$
- Force is \perp to both $v \perp B$



Directions: $+x$ $-x$ $+y$ $-y$ $+z$ $-z$
"Paper Space" = R L U D Out In
"Model Space" = E W N S Up Down

TB