Lab physics2

※ power unit

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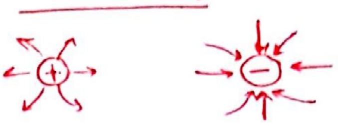
Exp1: Electric field mapping

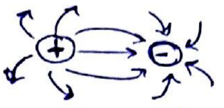
① $$\boxed{\vec{E} = \frac{\Delta V}{d}}$$

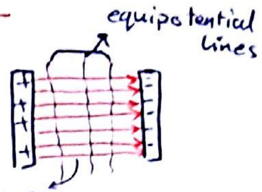
المجال المنتظم

* Electric lines

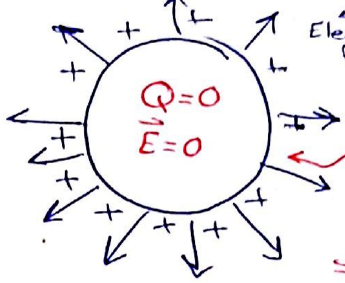


* Electric field lines / Line of force always ⊥ to equipotential line.





Electric field lines / Lines of force



* سطح الموصل هو سطح تساوي جهد.

قوانين الشغل ①

① → $\boxed{\Delta W = q\,\Delta V}$

③

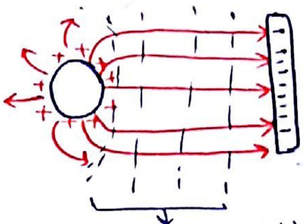
② → $\boxed{\Delta W = Fd\cos\theta}$

* W=0 at equipotential lines

because $\Delta W = Fd\cos\theta$ | $\theta = 90$ lines of force ⊥ equipotential lines

$\Delta W = Fd\cos 90$

$\Delta W = \text{zero}$



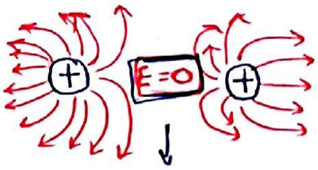
equipotential lines

* Therefore $\Delta V = 0$ zero also at equipotential line

$\Delta W = q\,\Delta V$ | ~~Therefore~~

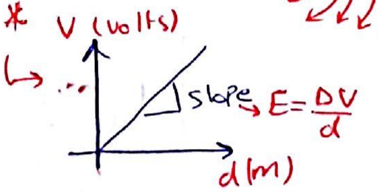
$\Delta V = \frac{\Delta W}{q}$

$\boxed{\Delta V = \text{zero}}$



equipotential Point.

*



* Therefore $\vec{E} = 0$ at equipotential lines

$\vec{E} = \frac{\Delta V}{d}$

$\boxed{\vec{E} = \text{zero}}$

ملخص قوانين EXP1

$\vec{Fe} = \frac{K q_1 q_2}{r^2}$

$\vec{E} = \frac{\vec{Fe}}{q} = \frac{KQ}{r^2}$

also

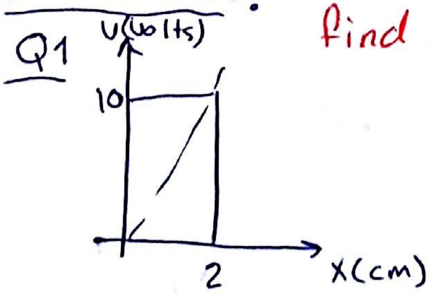
$\vec{E} = \frac{\Delta V}{d}$

$\Delta W = q\,\Delta V$

$\hookrightarrow = Fd\cos\theta$

2015 mid Exam:

Q1



find $\vec{E}$??

Sol:

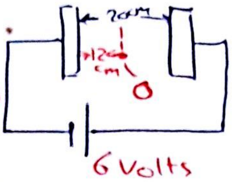
$\vec{E} = \frac{\Delta V}{d}$

$= \frac{10}{2\times10^{-2}}$

$\boxed{\vec{E} = 500\ V/m}$

Final 2005 Exam :

Find $\vec{E}$ at point O



Sol

$$\vec{E} = \frac{\Delta V}{d}$$

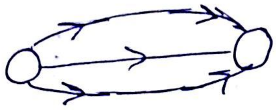
$$= \frac{6}{12\times10^{-2}}$$

$$\boxed{\vec{E} = 50 \text{ V/m}}$$

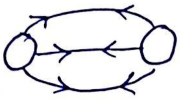
mid 2015 :

Determine the shape of electric field lines:

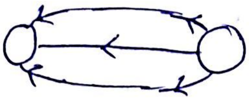
a)



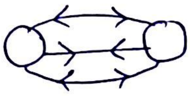
c)



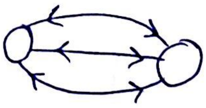
b)

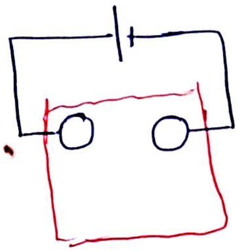


d)



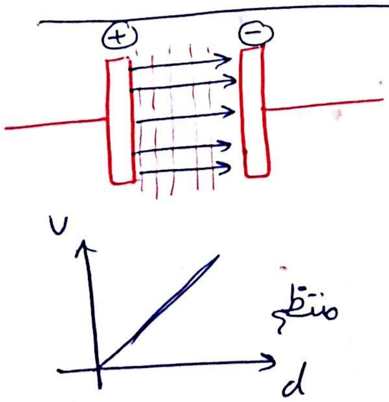
e)

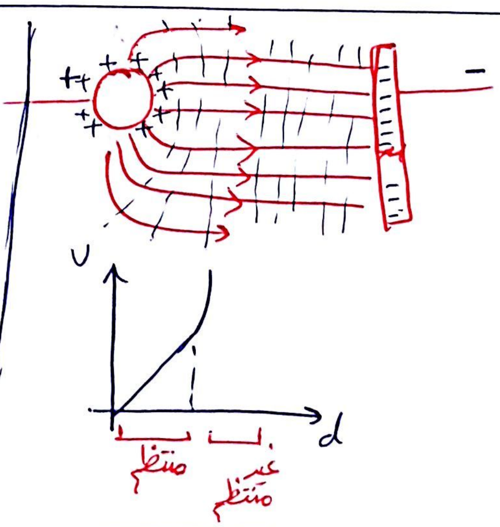


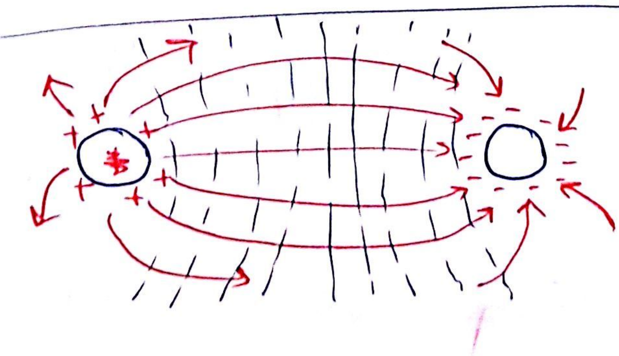


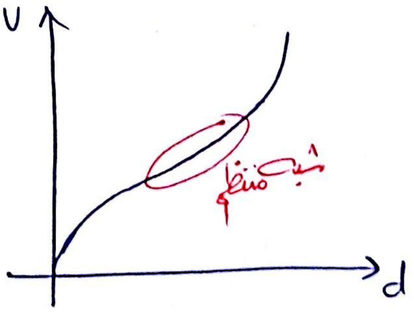
Sol:

The answer is $\boxed{a}$



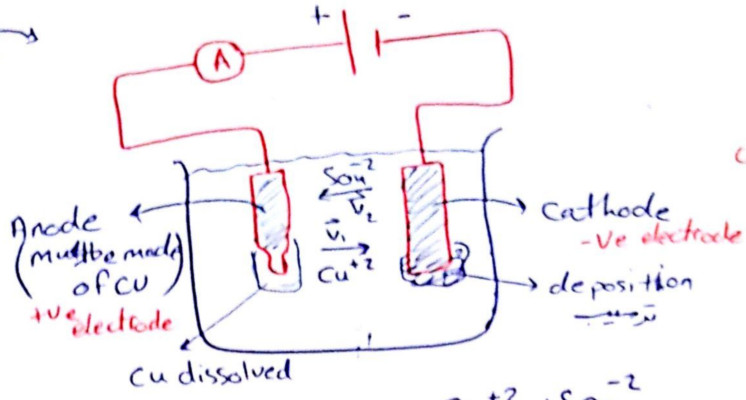






Exp2: Specific charge of copper IONS

Electrolysis →
التحليل الكهربائي



$CuSO_4 \rightarrow Cu^{+2} + SO_4^{-2}$

density of charge $[\frac{1}{m^3}]$

$\vec{J} = n q \vec{V}$

current density $[A/m^2]$

Charge

Velocity of charge $[m/s]$

$P.E = \left| \frac{E_A - E_P}{E_A} \right|$

Percentage of Error

* $\Delta M = M_{cu} = m_2 - m_1$

$\vec{J} = \vec{J}_1 + \vec{J}_2$

$= n_1 q_1 \vec{V}_1 + n_2 q_2 \vec{V}_2$ $\boxed{\vec{J} = 2n|q|\vec{V}}$

$\rightarrow n_1 = n_2$

$\rightarrow q_1 = -q_2 = |q|$

$\rightarrow \vec{V}_1 = -\vec{V}_2 = |\vec{V}|$

$\boxed{K = \frac{\Delta Q}{\Delta M}}$

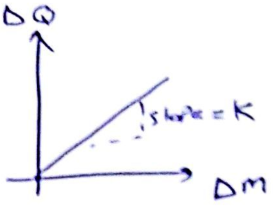
$[K] = \frac{C}{Kg}$

$\Delta Q_{cu} = K M_{cu}$

$\boxed{\Delta Q = I \Delta t}$

- Charge of Cu = $K M_{Cu}$
- Charge of e^- = $\frac{K * M_{cu}}{2}$

$\boxed{Q_{cu} = 2e^-}$



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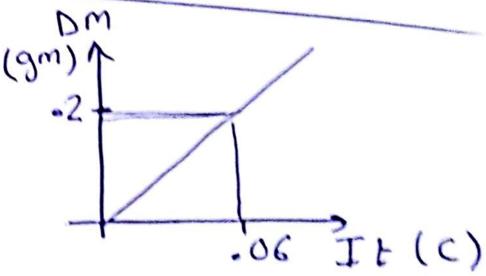
mid 2015 Exam:

From the graph the electrochemical equivalent of copper in (~~gm/c~~) is:
c/gm



Sol:

$K = \frac{\Delta Q}{\Delta M}$ | $\Delta Q = I \cdot t = .06\ C$

$\Delta M = .2\ gm$

$= \frac{.06}{.2}$

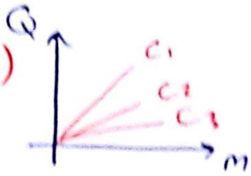
$\boxed{K = .3\ C/gm}$

Final 2005 Exam:

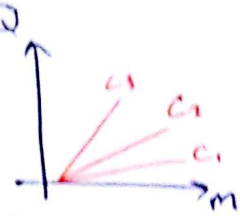
I) ~~$C_1 > C_2 < C_3 < C_4$~~ concentration is, $C_1 > C_2 > C_3$

A)

B)



C)



The Answer is: $\boxed{A}$

II) The Mcu depends only on:

✓ mass of deposited copper

a- The current in the cell

b- The product of the current in the cell and the Voltage across the cell

c- The time ~~durati~~ duration of current flow

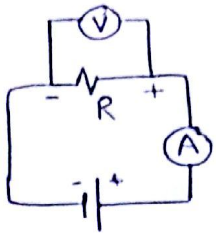
d- The product of the current in the cell and the time duration of current flow

The answer is $\boxed{D}$

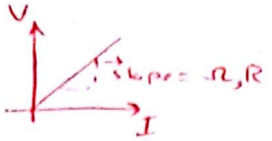
$$K = \frac{\Delta Q}{M_{Cu}}$$

$$M_{Cu} = \frac{\Delta Q}{K} \rightarrow I \times t$$

EXP3 : Ohm's law



$$\boxed{R = \frac{V}{I}}$$



$$\boxed{R = \frac{\rho L}{A}}$$

ρ: resistivity (Ω.m)

L: length of ~~wire~~ R (m)

A: cross sectional Area of wire [m^2]

~~multiple resistors~~

~~Parallel | Series~~

~~$Req = \left(\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_n}\right)^{-1}$ | $R_1+R_2+R_n$~~

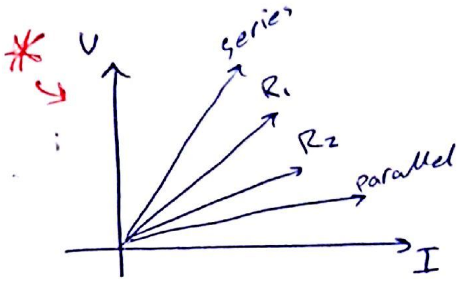
multiple Resistors

→ Series:

$Req = R_1 + R_2 + R_n$

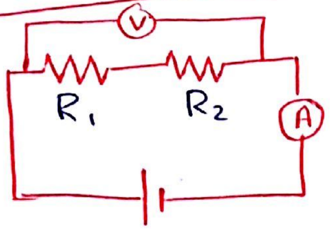
→ Parallel:

$Req = \left(\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_n}\right)^{-1}$



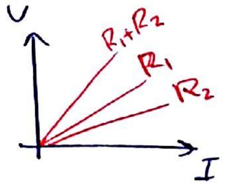
MID EXAM 2015:

I)

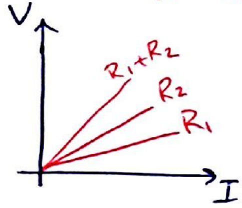


for the following circuit which figure is correct?? if $R_1 < R_2$

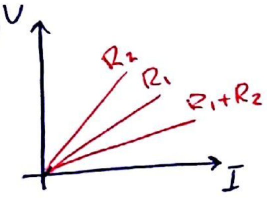
a)



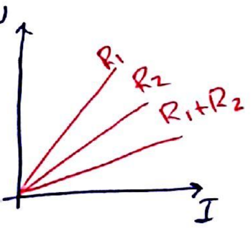
b)



c)



d)



Sol:

The answer is

$\boxed{B}$

II) If $R_1 = 3\,\Omega$ and $R_2 = 10\,\Omega$ then Req is __ if R_1 & R_2 are parallel

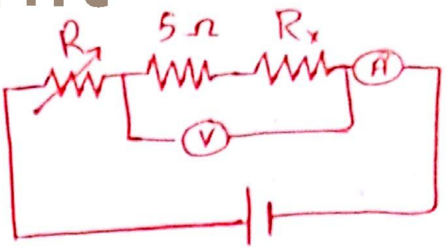
Sol:

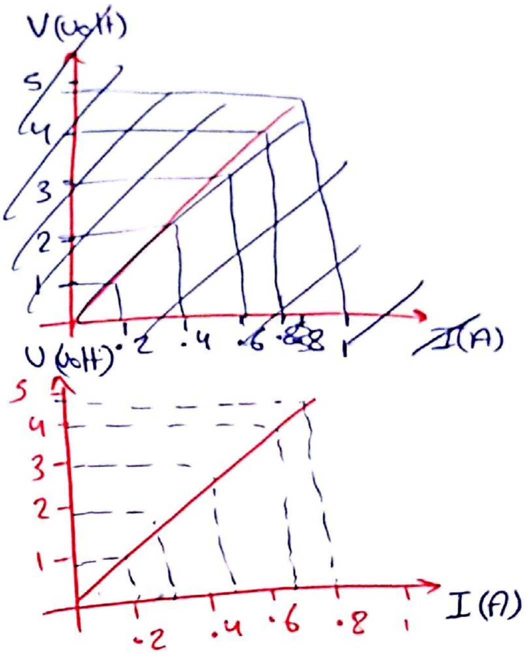
$$Req = \frac{R_1 * R_2}{R_1 + R_2} = \frac{30}{13}\,\Omega = 2.308\,\Omega$$

Exam 2005:

The following graph is obtained for the circuit shown where Rx is a wire resistance of .1mm diameter and 1m long then its resistivity is

$\rho =$ ______ $(\Omega.m)$





Sol:

$$R_{eq} = \frac{5}{.8}$$

$$= 6.25$$

$$R_x = R_{eq} - 5$$

$$R_x = 1.25\,\Omega$$

$$R_x = \frac{\rho L}{A}$$

$$1.25 = \frac{\rho * 1}{\cancel{2*\pi*1*10^{-4}}\ \frac{\pi}{20} \times 10^{-3}}$$

$$A = 2\pi r^2$$

$$\cancel{=}\ \cancel{2*\pi*1*10^{-4}}$$

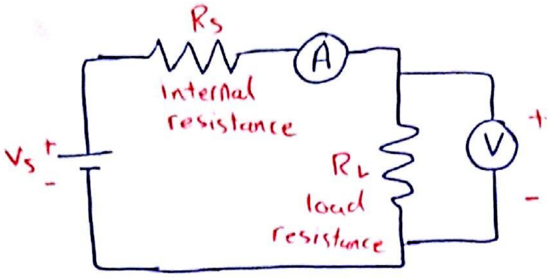
$$= \pi * \frac{1}{20} \times 10^{-3}$$

~~$\rho = 2.5 * \pi \times 10^{-4}\ (\Omega.m)$~~

~~$\boxed{\rho = 7.854 * 10^{-4}\ (\Omega.m)}$~~

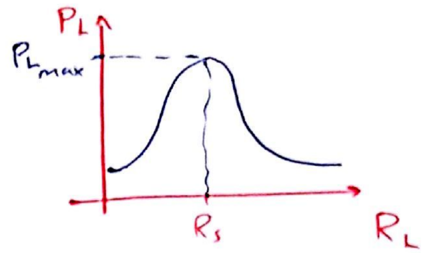
$\rho =$

Exp 4: power Transfer



* Maximum power Transfer

when $\boxed{R_L = R_s}$



⇒ * $P_L = V_L * I$

∘ $P_L = I^2 * R_L = V_L^2 / R_L$ & $P_s = I^2 * R_s = V_s^2 / R_s$

∘ if $R_s > R_L$

→ $P_s > P_L$

$V = I R_L$

*I_{Load} Max → R_L min

*V_{Load} Max → R_L max

Exam 2005:

A 6 Volt Battery with a 10Ω internal resistance is connected across a variable load ~~resistance~~ resistor R_L

A- Find Maximum power dissipated in R_L

$P_{L max}$ = ______ watt

Sol:

$P_{L max} \rightarrow R_L = R_s = 10\Omega$

$I = \frac{V_{Battery}}{R_s + R_L}$

$= \frac{6}{20}$

$\boxed{I = .3 A}$

$P_L = I^2 * R_L$

$= (.3)^2 * 10$

$\boxed{P_L = .9 \text{ watt}}$

B- when the power dissipated in the load resistor is maximum, the voltage across it is

V_L = ______ volt

Sol

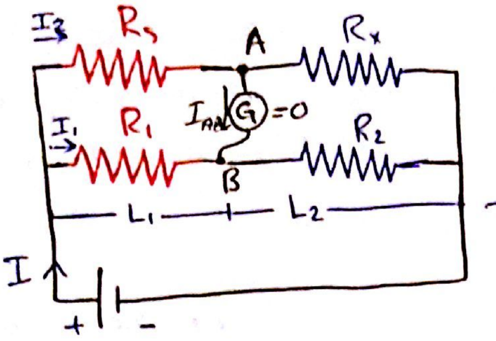
$P_{L max} = .9 \text{ watt} = V_L^2 / R_L$

$.9 = V_L^2 / 10$

$9 = V_L^2$

$\boxed{V_L = 3 \text{ Volt}}$

Exp5 : The wheatstone Bridge :



* B : Balance Point where Ⓖ reads zero.

* $I_{AB} = 0$ when Ⓖ reads zero

Then

$$V_{R_s} = V_{R_1} \quad \& \quad V_{R_x} = V_{R_2}$$

$$I_2 R_s = I_1 R_1 \quad | \quad I_2 R_x = I_1 R_2$$

$$\frac{I_2}{I_1} = \frac{R_1}{R_s} \quad | \quad \frac{I_2}{I_1} = \frac{R_2}{R_x}$$

$$\boxed{\frac{R_1}{R_s} = \frac{R_2}{R_x}}$$

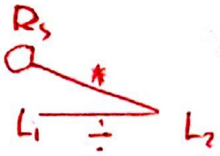
$$\Downarrow$$

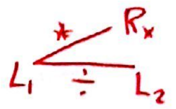
$$\boxed{R_x = R_s \frac{L_2}{L_1}}$$

* $R_1 = \frac{\rho L_1}{A}$

$R_2 = \frac{\rho L_2}{A}$

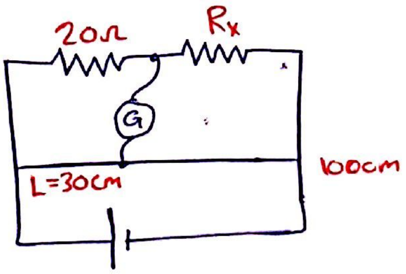
$\frac{R_2}{R_1} = \frac{L_2}{L_1}$





MiD Exam 2015 :

for the following circuit if the Galvanometer reads zero what is the Value of R_x ??



Sol

$R_x = R_s * \frac{L_2}{L_1}$

$R_x = 20 * \frac{7\cancel{0}}{3\cancel{0}}$

$\boxed{R_x = 46.6667 \Omega}$

Exam 2005:

A- In a wheatstone Bridge exp. a known Resistor and unkown Resistor was connected to a Balance point was at L_1. The known and the unkown resistors were then exchanged and the new balance point was at L_2. when the wheatstone Bridge formula is used the measured value of the unkown Resistor is different in the two cases because:

Note: The total length of the wire is kept constant

a) The galvanometer is not accurate

b) The battery voltage changes during the experiment

c) The cross section of one meter wire is not constant

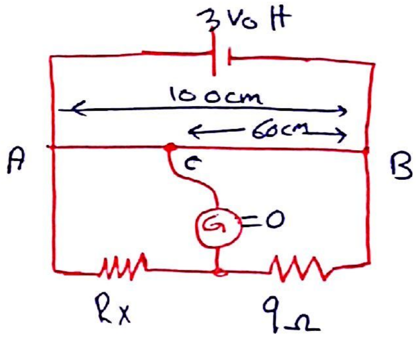
d) None of the above

The Answer is $\boxed{d}$

*Note: because the change will be $\frac{L_2}{L_1}$ in first case and $\frac{L_1}{L_2}$ in second case.

~~B-~~

B- Find R_x in the following circuit



Sol:

$$R_x = R_s * \frac{L_2}{L_1}$$

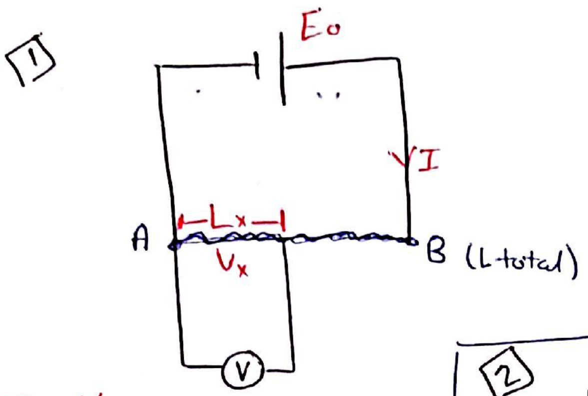
$$= 9 * \frac{\cancel{60}\,cm}{\cancel{100}\,cm} \quad \frac{90}{60}$$

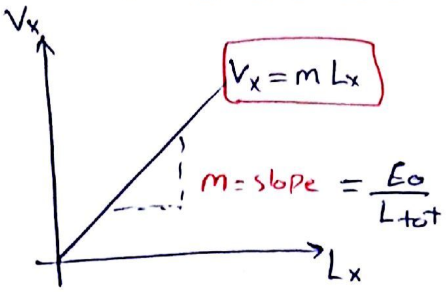
40

$$\boxed{R_x = 13.5\,\Omega}$$

$$\boxed{R_x = 6\,\Omega}$$

Exp 6 : The potentiometer





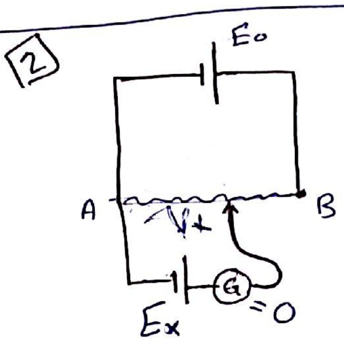
$\rightarrow I = \frac{V}{R}$

$= \frac{E_o}{\frac{\rho L_{total}}{A}}$

$\rightarrow V_x = I R_x$

$= \frac{E_o}{\frac{\cancel{\rho} L_{total}}{\cancel{A}}} * \frac{\cancel{\rho} L_x}{\cancel{A}}$

$$\boxed{V_x = \underbrace{E_o \frac{L_x}{L_{tot}}}_{m\ (slope)}}$$



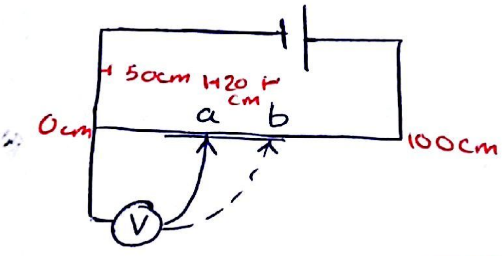
* when G read zero

~~E_x~~ $\Rightarrow V_x = E_x$

$\Rightarrow \boxed{m L_x = E_x}$

MID 2015 :

For the circuit in the figure the voltmeter reads (4 volts) at point b then the voltage at point a is ____ volts



Sol :

$V_b = 4$ volt

$V_x = m L_x$

$m = \frac{V_x}{L_x}$

$m_b = \frac{4}{70\ cm}$

$m_b = 5.714$

$m_a = \frac{E_o}{L_{tot}}$

$m_b = \frac{E_o}{L_{tot}}$

$E_o = 5.714$

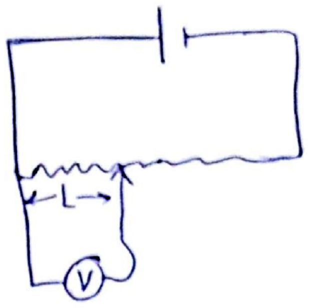
$V_a = m L_x$

$= 5.714 \times 50 \times 10^{-2}$

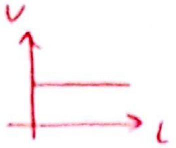
$\boxed{V_a = 2.857 \text{ volts}}$

MID EXAM 2015:

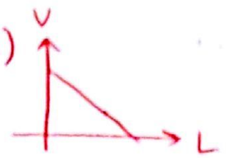
The following circuit can produce which of the following graphs??



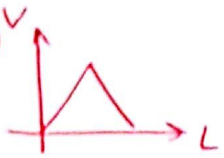
a)



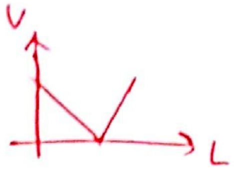
b)



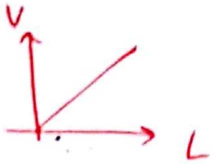
c)



d)

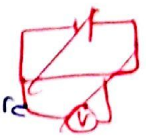


e)



The answer is $\boxed{e}$

2005 Exam:



A- For the circuit shown no balance point was ~~found~~ obtained on the slidewire then:

a) Ex is smaller than 3 V

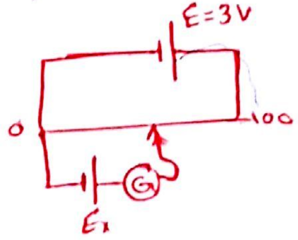
b) Ex is greater than 3V

c) cannot tell anything about Ex

d) Ex has an internal resistance greater ~~that~~ than the resistance of the slide wire

The answer is $\boxed{b}$

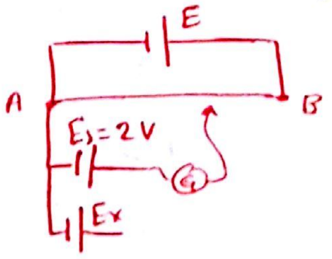
b



~~B-~~

B- For the given circuit, when Es was connected the balance point occured at 20cm from A, then it was removed, Another battery Ex was connected the balance occured at 15cm from A

Then Ex = ____ volt?



Sol:

$E_s = m_1 L_s$

$m = \frac{E_s}{L_s}$

$= \frac{2}{20cm}$

$\boxed{M = 10}$

$m = \frac{E_0}{L_{tot}} \rightarrow 1m$

$\boxed{10V = E_0}$

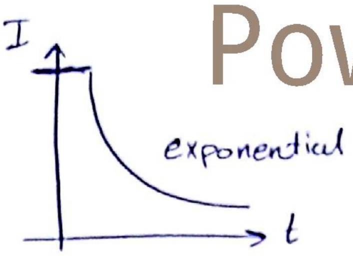
$E_x = m L_x$

$= 10 \times 15 \times 10^{-2}$

$\boxed{E_x = 1.5V}$

Exp 7: The RC time constant

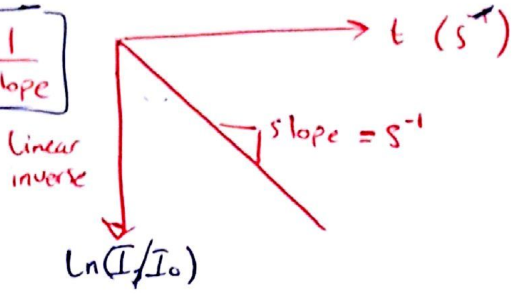
τ (time constant) = $R * C$



$$\boxed{I = I_0 e^{-t/RC}} \quad \boxed{I_0 = \frac{V_0}{R}}$$

$$\boxed{\ln\left(\frac{I}{I_0}\right) = \frac{-t}{RC}}$$

$$\boxed{\tau = \frac{-1}{\text{Slope}}}$$



$$\ln\frac{I}{I_0} = -t * \frac{1}{\tau}$$

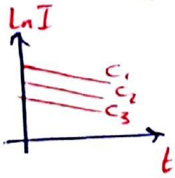
$$\tau = \frac{-t}{\ln\left(\frac{I}{I_0}\right)}$$

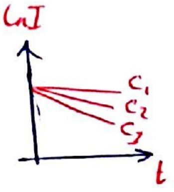
$$\frac{\ln\left(\frac{I}{I_0}\right)}{t} = \text{slope}$$

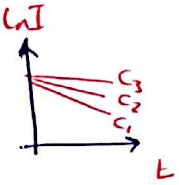
Exam 2005:

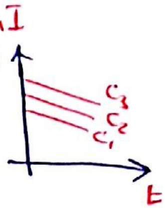
A- $C_1 = 250\,\mu F$, $C_2 = 500\,\mu F$, $C_3 = 750\,\mu F$

which graph represents the correct relationship

a)


b)


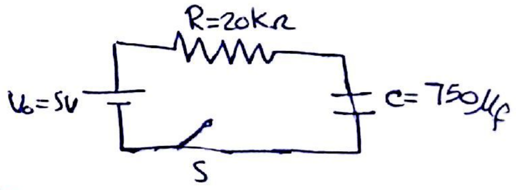
c)


d)


The answer is ☐

b

B- in the following circuit find I after one minute of closing the switch S



Sol

$I = I_0 e^{-t/RC}$

$RC = 20k * 750\overset{m}{\cancel{\mu}}$

$RC = 15\cancel{0}$ Sec

$I_0 = \frac{V_0}{R}$

$I_0 = \frac{5}{20k}$

$= .25\,mA$

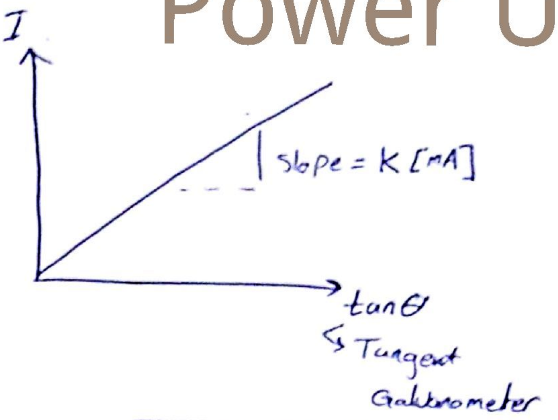
$I = 25 * 10^{-5} * e^{-60/15}$

$\boxed{I = 4.58\,\mu A}$

Exp 8: The magnetic field of a current

K: Reduction factor of Galvanometer

$$\boxed{K = \frac{\Delta I}{\Delta \tan\theta}}$$



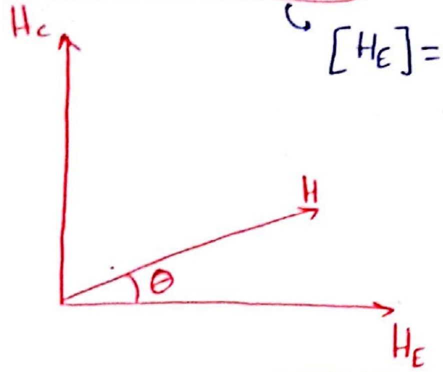
$$\boxed{H_E = \frac{2\pi N K}{10\, a}}$$

N: number of turns

a: radius of the coil

$[H_E]$ = Gauss

$$\boxed{H_c = \frac{2\pi N I}{10 a}}$$

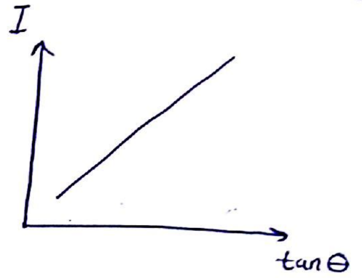


*(magnetic field) $H_c \perp H_E$ (earth magnetic field)

$$\boxed{\tan\theta = \frac{H_c}{H_E}}$$

Exam 2015:

what does the slope represents in the magnetic field of a current experiment ??



Sol:

$\frac{\Delta I}{\Delta \tan\theta} = k$: Reduction factor of a galvanometer

---

Exam 2005:

A- The deflection θ of the compass needle in the tangent galvanometer depends on:

a) The current flowing in the coil

b) The number of turns in the coil

c) The value of the horizontal component of the earth's

d) all of the above

The answer is $\boxed{a}$

B-a N

B - If you have a coil of diameter 25cm with 150 turns and the magnetic field of the earth $\overset{H_c}{\text{is}}$. 0.28 Gauss then the reduction factor $\underline{K}$ of tangent galvanometer is:

K = ________ (A)

$$\boxed{k = \frac{\Delta I}{\tan\theta}}$$

$$H_E = \frac{2\pi N k}{10a}$$

$$H_c = \frac{2\pi N I}{10a}$$

$$\tan\theta = \frac{Hc}{H_E}$$

Sol:

$a = 12.5\ cm$ | $N = 150$ turns

radius = $\frac{\text{diameter}}{2}$ | $H_E = .28$ Gauss

$k\cancel{k}$ $H_E = \frac{2\pi N k}{10a}$

$$.28 = \frac{2\pi * 150\ k}{10 * 12.5 * \cancel{10}^{-2}}$$

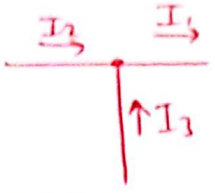
$$\cancel{\frac{1.25 * .28}{300\pi} = K} \qquad K = \frac{125 * .28}{300\pi}$$

$$\cancel{\boxed{K = 371.4\ \mu A}} \qquad \boxed{k = 371.4 * 10^{-4} A}$$

Exp 9 : Kirchoff's laws :

$\sum I_{in} = \sum I_{out}$ ← (first law)

$\sum V = 0$ ← (second law)



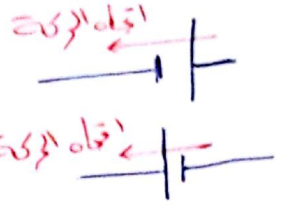
* $\boxed{I_1 = I_2 + I_3}$

* فرق الجهد في البطارية من الـ ⊖ إلى الـ ⊕

* افرض اتجاه الحركة

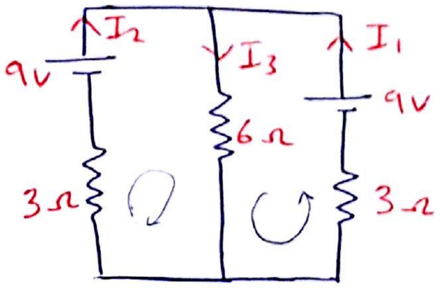
* لـ IR مع اتجاه الحركة : سالب (الجهد)

IR عكس 〃 〃 : موجب (الجهد)



Exam 2014 :

Determine I_3 in ~~figure~~ the circuit shown ??



Sol :

apply Kirchoff's first law

* $I_3 = I_1 + I_2$ —①

apply Kirchoff's Second law

* $-3I_2 + 9 - 6I_3 = 0$ —②

* $-3I_1 + 9 - 6I_3 = 0$ —③

* Subsitute ① in ② & ③

→ $-3I_2 + 9 - 6(I_1 + I_2) = 0$

→ $-3I_1 + 9 - 6(I_1 + I_2) = 0$

~~$-9I_2$~~ $\boxed{9I_2 + 6I_1 = 9}$ اضرب في * 6

$\boxed{9I_1 + 6I_2 = 9}$ * 9

واطرح المعادلتين

$54\cancel{I_2} + 36I_1 = 54$

$\cancel{54}I_2 + 81I_1 = 81$ ⊖

$45I_1 = 27$

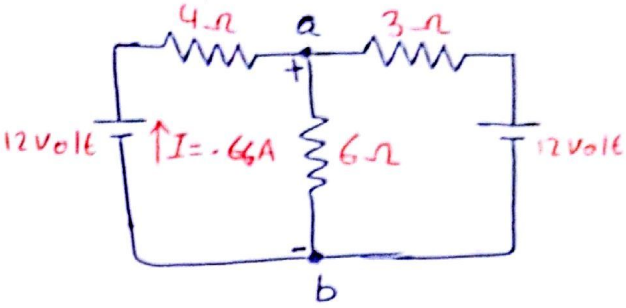
$\boxed{I_1 = .6A}$ $\boxed{I_2 = .6A}$

$I_3 = I_1 + I_2$

$\boxed{I_3 = 1.2A}$

Exam 2005:

For the circuit shown
Find
V_{ab} 8 $I(R=3\Omega)$



Sol:

V_{ab}

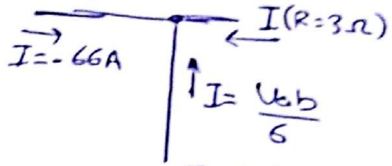
apply Kirchoff's 2nd law

$$12 - 4 * .66 - U_{ab} = 0$$

$$-12 + 4 * .66 + U_{ab} = 0$$

$$\boxed{V_{ab} = 9.36 \text{ volts}}$$

$I(R=3\Omega)$



$I = 1.56A$

$$.66 + 1.56 + I = 0$$

$$\boxed{I = -2.22A}$$

Exp 10: Electromagnetic Induction

الحث الكهرومغناطيسي: $= -\frac{d \Theta B}{dt}$

$$\mathcal{E} = -\frac{\Delta \phi}{\Delta t}$$ → magnetic flux

- Two files
  - Primary
    (Clockwise)
    (CW)
    always
  - Secondary
    - Clockwise (CW)
    - Counter clockwise (CCW)

I) ~~primary inside secondary, primary current on ⇒ CCW [small]~~

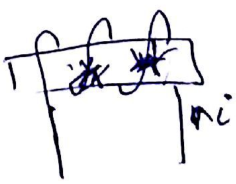
~~II) // // // , // // off ⇒ CW [small]~~

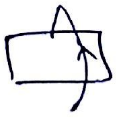
* [~~Primary inside Secondary~~]

Counter Clockwise
- → primary current on
- → Iron rod
- → brass rod
- → North pole inside Secondary
- → South pole outside Secondary

(North/south) pole (in/out) secondary → (large effect)

Iron rod → (large)





A → B

B → A

B → A

Exp 11: The Lenses

f : focal length of the lens (البعد البؤري)

i : image distance from the lens (الخيال)

O : Object distance from the lens

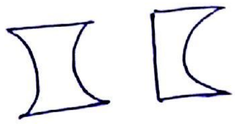
$$\boxed{\frac{1}{f}=\frac{1}{i}+\frac{1}{O}}$$

$$\boxed{M=\frac{-i}{O}}$$ → M: magnification E [التكبير]

a. converging محدبة lens

real & inverted

$$\Delta f=\sqrt{\frac{\Sigma(f-\bar{f})^2}{n(n-1)}}$$



b. diverging مقعرة lens

→ ~~inverted image~~

real erect

Quantity	Negative	Positive
O	Vertical object	Real object
i	Vertical image	Real image
f	diverging lens	converging lens
m	inverted image	erect image

(O` → negative)

converging

* real,

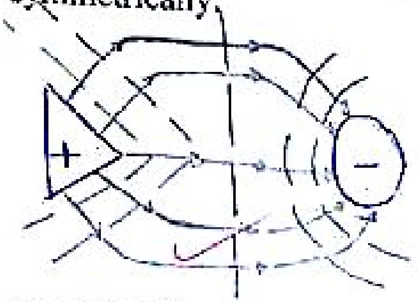
Done by: Hamza Abedrabbo

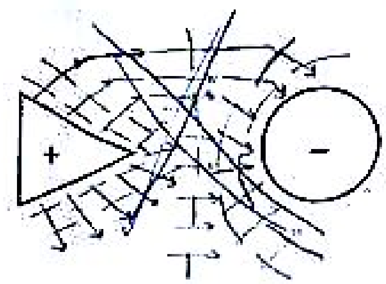
University of Jordan
General Physics Lab – Phys. 112 – Mid Exam
Date: 24/11/2015

Summer Semester
Student's Name: Sarah Khalil [illegible]
Student's Number: 0151263
Time: 1:00 – 1:30
Instructor: [illegible]
Section: 5

Electric Field Mapping

(Q1) For the following shown electrode arrangement, sketch **clearly five electric fiel lines** as solid lines and **five equipotential lines** as intermittent lines, distribute symmetrically.





The electric field perpendicular on lines.

Specific Charge of Copper Ions

(Q2) The specific charge of copper ions (K) is 3.03×10^6 C/kg. If a current (I) of 1.0 A is passed in a $CuSO_4$ solution for 30 minutes, then the amount of copper (m) deposited on the cathode (in grams) is:

(a) 0.396 ; (b) 0.012 ; (c) 1.19 ; (d) 3.35 ; [✓ (e)] 0.594 ;

$k = \frac{q}{m} = \frac{It}{m} = \frac{[illegible]1 \times 30 \times 60}{m} =$

Measurement of Resistance: Ohm's Law

(Q3) A wire of length L and of cross sectional area A. When a potential difference V is applied across this wire, a current I passes through. The resistivity ρ is calculated as:

(a) $\rho = (L I) / (V A)$; [✓ (b)] $\rho = (A V) / (I L)$; (c) $\rho = (A I) / (V L)$;
(d) $\rho = (L V) / (I A)$; (e) $\rho = (A I L) / (V)$;

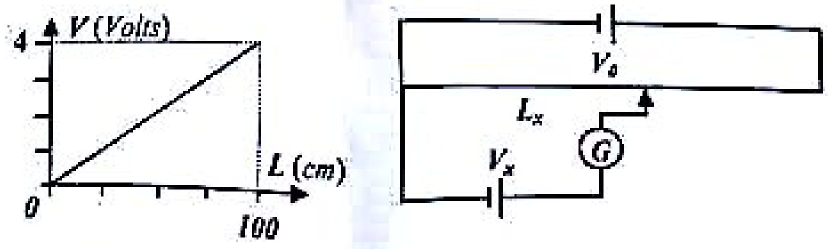
$R = \frac{\rho}{}$

$V = IR = I\frac{\rho L}{A} = V \rightarrow \rho = \frac{VA}{IL}$

Potentiometer

(Q4) A potentiometer of 100 cm wire and its corresponding calibration graph are both shown in the next figure. If the balance point (Zero reading of Galvanometer) is located at L_x = 30 cm, the voltage (V_x) of the unknown battery is:

(a) 1.50 ; [✓ (b)] 1.20 ; (c) 1.10 ; (d) 2.20 ; (e) 2.00 ;



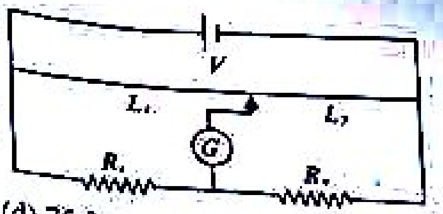
$V_x = \text{Slope}\ L_x$

$\text{Slope} = \frac{4-0}{0.100} = (0.04)\times10^{2}$

$\frac{4-0}{100\times10^{-2}-0} = 4$

$V_x = 4(30)\times10^{-2}$

Measurement of Resistance: Wheatstone Bridge



(Q5) A Wheatstone bridge circuit of 100 cm wire is shown in the next figure. Take $R_s = 75\ \Omega$, determine the value of the resistance R_x (in Ω) if the null point (Zero reading of Galvanometer) is at $L_1 = 60$ cm, and $L_2 = 40$ cm.

● 50.0 ; (b) 112.5 ; (c) 60.0 ; (d) 75.0 ; (e) 45.9 ;

$R_x = R_s \frac{L_2}{L_1} = 75 \times \frac{40}{60}$

$R_x = R_s \frac{L_2}{L_1}$

$V_x = V$

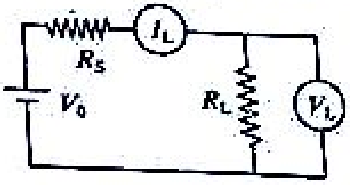
$I_1 R_x = I_2 \frac{\rho L_2}{A}$

$\cancel{I_1} R_s = \cancel{I_2} \frac{\rho L_1}{A}$

Power Transfer

(Q6) For the following electric circuit, the following data is obtained in this experiment:

R_L (Ω)	10	20	30	40	50	60	70	80	90	100
V_L (V)	1.0	1.7	2.1	2.5	2.7	3.0	3.2	3.3	3.5	3.6
I_L (mA)	100	83	71	62	55	50	45	42	38	36



From the data determine:

(a) P_{max} (mW) = ~~150~~ 155 mW

(b) R_s (Ω) = ~~60~~ 40 (R)

(c) V_0 (V) = ~~6~~ 4.98 (V)

$P = IV = I^2 R$

P's max when $R_s = R_L$

R_L	10	20	30	40	50	60	70	80	90	100
P (mW)	100	141.1	149	155	148.5	150	144	138.6	133	129.6

$-V_0 + R_s I_L + V_L = 0$

~~$V_0 = 60(50)\times 10^{-3} + 3 = 6$~~

$V_0 = 40(62)\times 10^{-3} + 2.5$