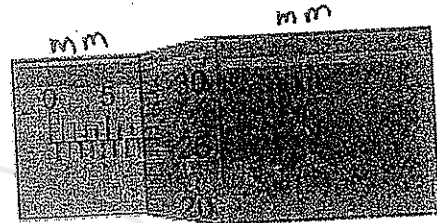


Lab III Quiz

Name: _____

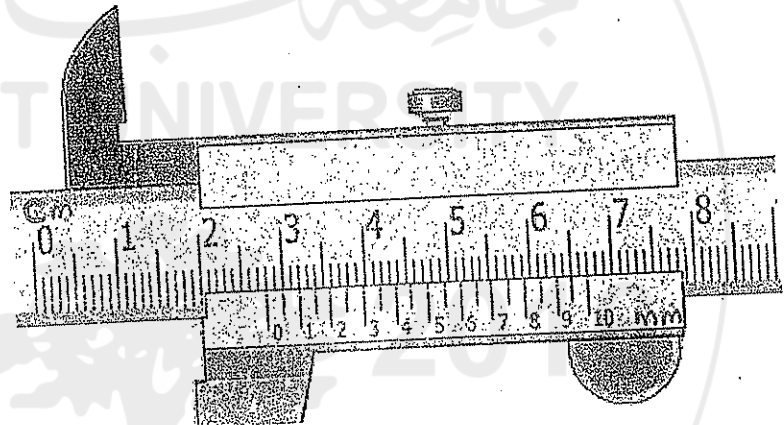
1) The reading of the micrometer is

- a) 7.260 mm
- b) 8.26 mm
- c) 7.760 mm
- d) 7.26 mm
- e) 7.76 mm



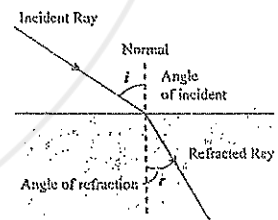
2) The reading of the vernier caliper is

- a) 28.45 mm
- b) 20.10 mm
- c) 28.60 mm
- d) 28.10 mm
- e) 20.60 mm



3) If a student measured the angle of incidence $i = 55.7^\circ$ in air and the angle of refraction $r = 38.4^\circ$ in water, the index of refraction for water can be determined to be

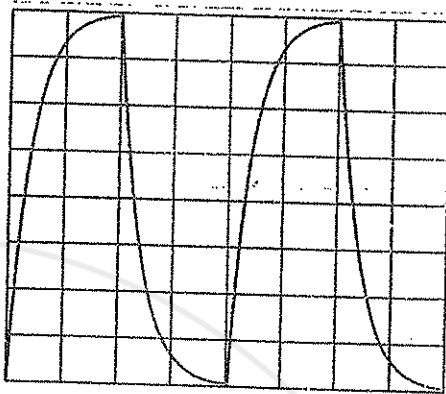
- a) 1.20
- b) 0.83
- c) 1.50
- d) 0.75
- e) 1.33



4) If the index of refraction of water is 1.33 and for glass is approximately 1.52, then the speed of light in water

- a) is the same as the speed of light in glass.
- b) is smaller than the speed of light in glass.
- c) is larger than the speed of light in glass.
- d) is larger than the speed of light in vacuum.
- e) is the same as the speed of light in vacuum.

5] The following figure represents an oscilloscope display and showing the voltage on a capacitor of an RC circuit. If $R = 400\Omega$, and the voltage multiplier is set to 1 volt/div , while the time base is set to $50 \mu\text{s/div}$; answer the following two questions



* The time constant of the RC circuit is approximately

- a) $40 \mu\text{s}$
- b) $400 \mu\text{s}$
- c) $100 \mu\text{s}$
- d) $20 \mu\text{s}$
- e) $5 \mu\text{s}$

* The value of the capacitor used in the circuit is approximately

- a) $0.05 \mu\text{F}$.
- b) $1.0 \mu\text{F}$.
- c) $0.1 \mu\text{F}$.
- d) 10 nF .
- e) $100 \mu\text{F}$.

6] You connected two signal generators to the oscilloscope in the external mode. The x-channel has a sinusoidal signal input with a frequency of 1000 Hz , while the y-channel has a sinusoidal signal input with a frequency of 2000 Hz . The figure that will appear on the oscilloscope display is similar to



Good Luck



Birzeit University
Physics Department
Physics 111
Quiz

10

Name: ~~Abdullah Alkhatib~~

ID#: ~~1001100001~~

Section: 6

No.	Problem	Answer Displayed by Calculator	Answer Expressed to the Correct Number of Significant Figures
1	6.12×0.5741	3.513492	3,51 /
2	$\frac{1.0367 \times 2.7}{13.3}$	0.210458	0,21 /
3	$15.34 + 6.127 - 10.1$	11.367	11,4 /
4	$\frac{71.349}{8.2}$	8.7010976	8,7 /
5	$32 + 5.328 + 7.1$	44.428	44 /
6	$(14.47)^2$	209.3809	209,4 /
7	$\ln(2.4)$	0.875469	0.88 /
8	$\sqrt{18.67}$	4.3208795	4,321 /
9	$\sin(72.4^\circ)$	0.9531907	0,953 /
10	$\tan(51.63^\circ)$	1.263044	1,263 /

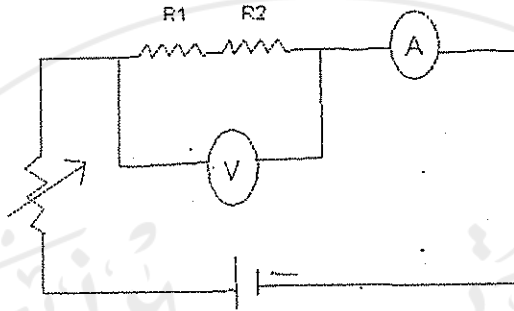
Quiz

Focal length of a convex lens:

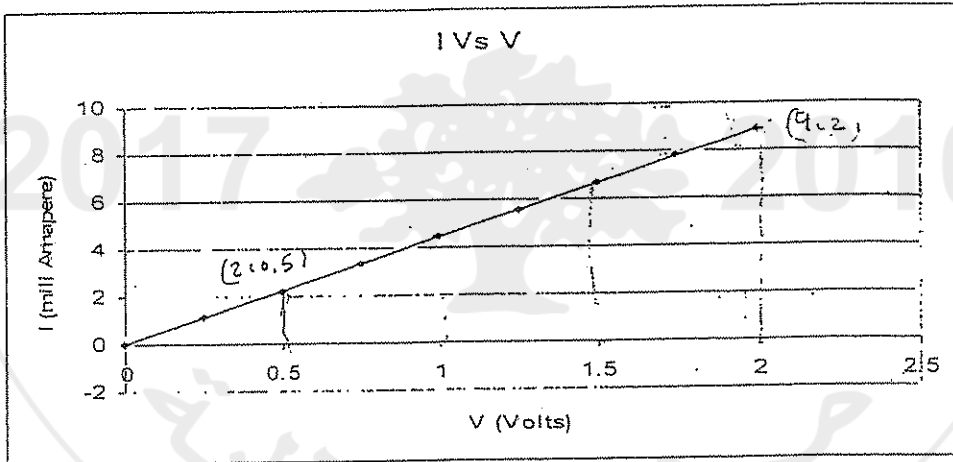
What is the physical quantity that we will measure in today's experiment?

DC circuits:

A student made the following connection in the physics lab.



And he obtained the following I-V characteristic graph by changing the value of the variable resistance connected in the circuit



$$R = R_1 + R_2$$

$$214.22$$

2

$$RI = V$$

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

Also he saw that the color code of the resistance number 2 was violet, green and black for the three nearby colors and the far color was silver.

$$75 \times 10^0 \Omega$$

Color	A/B
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

Color	Value
Black	10^0
Brown	10^1
Red	10^2
Orange	10^3
Yellow	10^4
Green	10^5
Blue	10^6
Violet	10^7
Gray	10^8
White	10^9

None
Silver
Gold
Red

2

1. What is the value of R_2 ?
2. What is the value of R_1 ?

~~$7 \times 10^5 \Omega$~~

$$75 \times 10^0 \Omega = 10\%$$

$$75 \pm 8$$

$$R_s = \frac{2 - 0.5}{(9 - 2) \times 10^{-3}}$$

$$R_s = 0.21$$

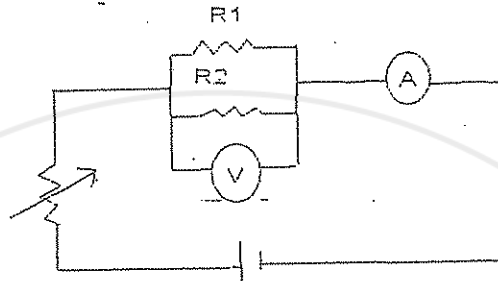
$$\frac{7.5}{75 \pm 8} \times \frac{10}{100} = 75$$

$$R = 139$$

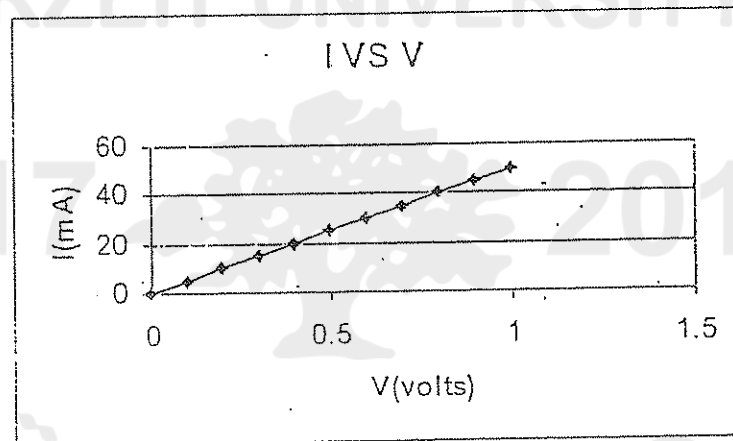
$$\frac{214.2}{75} = 75 \pm A$$

Physics Laboratory III
Quiz #2

A student made the following connection in the physics lab.



And he obtained the following I-V characteristic graph by changing the value of the variable resistance connected in the circuit



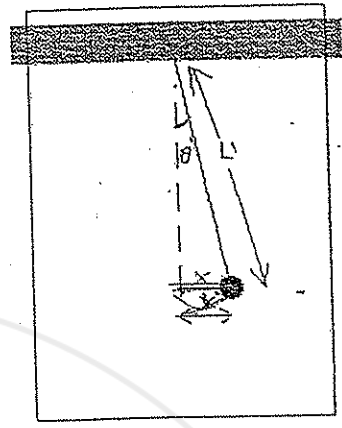
Also he saw that the color code of the resistance number 2 was violet, green and black for the three nearby colors and the far color was silver.

1. What is the value of R_2 ?
2. What is the value of R -equivalent for the parallel combination of resistances?
3. What is the value of R_1 ?

NAME: _____

No.: _____

1. For the pendulum shown on the right, find out the period of oscillations T , given that $\theta = 15^\circ$, and $x = 10.35$ cm.



$$T = \frac{4\pi^2 L}{g}$$

~~$x \sin \theta = 10.35 \times \sin 15^\circ = 2.7$~~

$$\sin \theta = \frac{x}{L} \quad 0.25 = \frac{10.35}{L}$$

$$L = 41.4$$

2- Given the equation

$$h = h_0 e^{-\lambda t}$$

answer the followings :-

$$T = \frac{2\pi}{\omega} = \frac{4\pi^2 L}{g}$$

$$= \frac{4\pi^2 \cdot 2}{g}$$

$$T = 12.8 \text{ sec}$$

a) What type this equation is ?

$$L = 10.35$$

b) Make a sketch for this equation (h vs. t):

c) Change the equation into linear equation.

$$\ln(h) - \ln(h_0) = -\lambda t$$

$$y_{\text{intercept}} = \ln(h_0)$$

$$\text{slope} \Rightarrow -\lambda$$

slope = $-\lambda$

$$y_{\text{int}} = \ln(h_0)$$

d) Make another sketch for the new linear equation.

$$\sin \theta_1 = \mu g \sin \theta_2$$

$$\mu g = \frac{\sin \theta_1}{\sin \theta_2}$$

$$\frac{\Delta \mu g}{\mu g} = \dots$$

Good Luck
S.M.

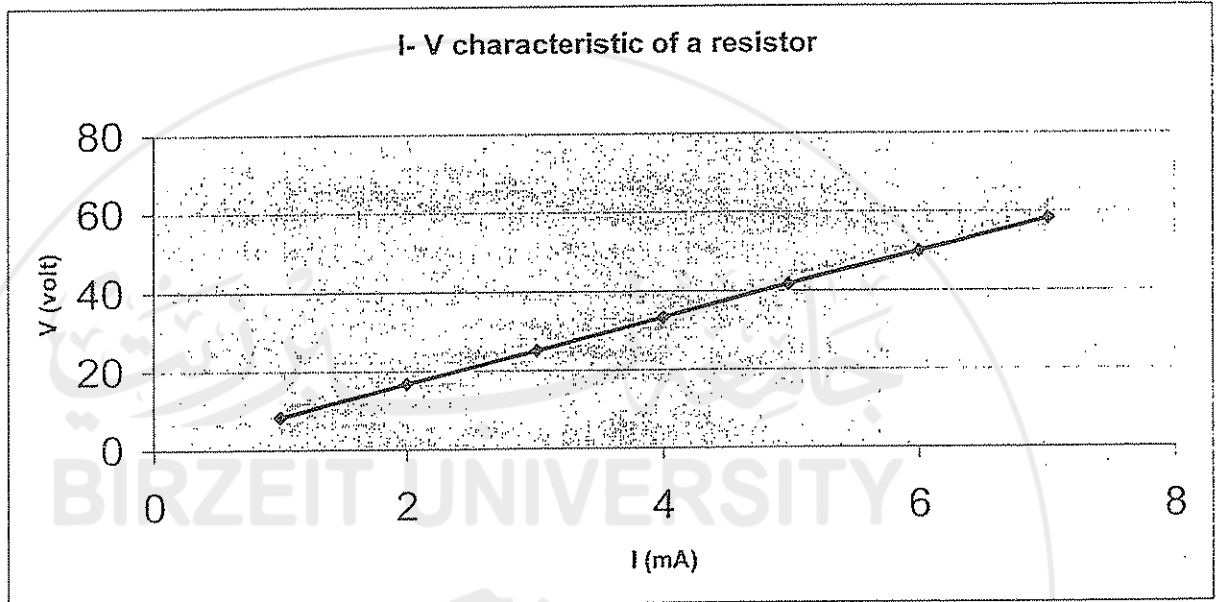
$$x_n = \frac{\ln(2)}{\lambda} = \frac{0.693}{\lambda}$$



10

Birzeit University
Physics Department
Physics 111

Name: ..Samah... Saeed... Mafagh..... Student number: ..1090780...



From the graph shown above, find:

- 1- The slope of the graph. $Slope = \frac{\Delta V}{\Delta I} = \frac{V_2 - V_1}{I_2 - I_1} = \frac{40 - 10}{4 - 1} = 7.6 \Omega$
- 2- The Value of the resistor. $R = \frac{V}{I} = \frac{40}{7.6} = 7.6 \times 10^1 \Omega$
- 3- The unit of the slope. The slope unit = Ω
- 4- The unit of R. $R = \Omega$

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

Knowing that the color code key of a resistor is as follows: Black- 0, Brown-1, Red- 2, Orange-3, Yellow-4, Green-5, Blue- 6, Violet-7, Gray- 8, White- 9. What are the colors of the resistor you got from the graph?

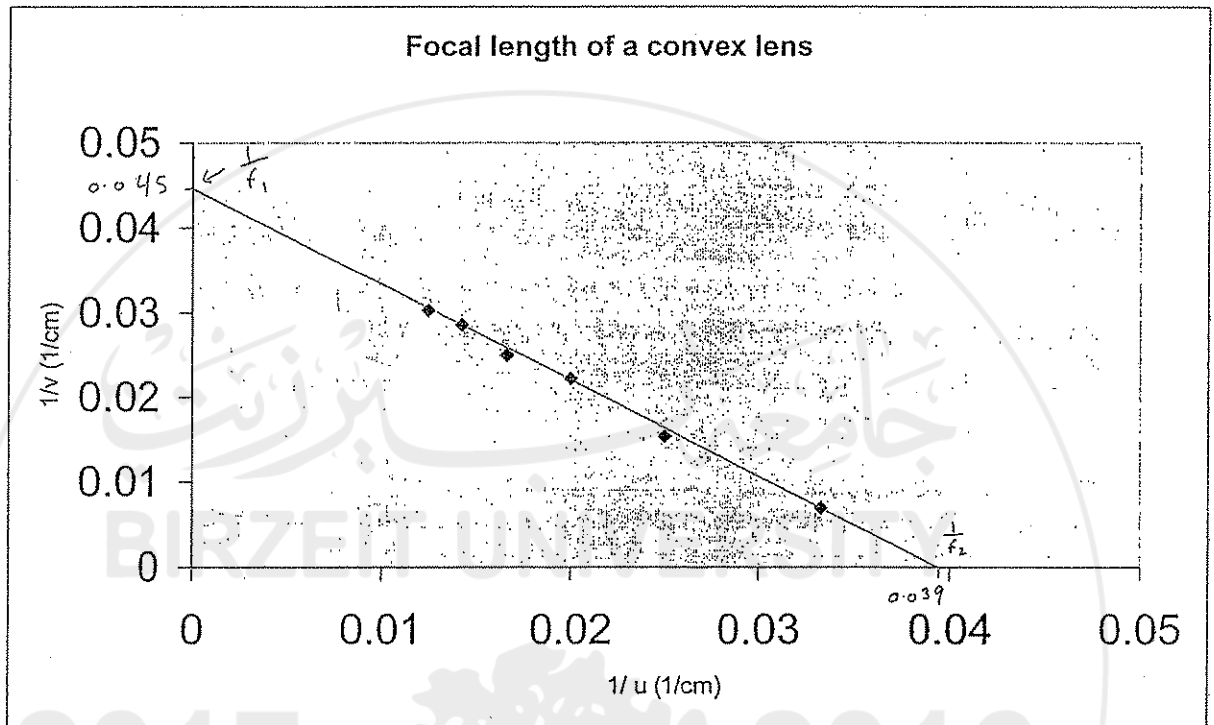
The colors are

- 1- The first color is ...violet.....
- 2- The second color is ~~orange~~... Blue
- 3- The third color is .Brown.....



Birzeit University
Physics Department
Physics 111

Name: Yacoub...Awad Student's number: 1a9.1.29.6



A student drew the points he got from the focal length experiment as shown above.

1. Draw a best line for the points shown above.
2. Find the values of $1/f$ from intersections on both axes.

$1/f_1 = 0.045$ (unit), $1/f_2 = 0.039$ (unit)

$\frac{1}{f_1} = 0.045$
 $1 = 0.045 f_1$
 $f_1 = \frac{1}{0.045}$

3. Find the values of f ,
 $f_1 = 22.2$ (unit), $f_2 = 25.6$ (unit)

4. Find the best value of f
 $f = 23.9$ (unit)

$f = \frac{1}{2} (f_1 + f_2)$
 $= \frac{1}{2} (22.2 + 25.6) = 23.9$ unit.

5. Why do you think we got two values of f ?

Because each lens has two focal lengths.

سرعة الضوء في الفراغ

$$\text{Index} = \frac{\text{سرعة الضوء في الفراغ}}{\text{سرعة الضوء في الوسط}}$$

سرعة الضوء في الفراغ = $\frac{3 \times 10^8}{1.52}$

Q3: The index of refraction of glass is near 1.52 and the speed of light in vacuum in m/s 3×10^8 . what is the speed of light in the glass?

$$1.52 = \frac{\text{Speed in vacuum}}{\text{Speed in the medium}} \Rightarrow 1.52 = \frac{3 \times 10^8}{\text{Speed in glass}}$$

و/ن Speed in glass = 1.97×10^8 m/s

Q4: Put a circle around the correct answer:

a-In the method of least square fit .the expression for the best line is derived from:

a) $\sigma^2 = \sum_{i=1}^N (Y_i - y_i)$ is minimum

b) $\sigma^2 = \sum_{i=1}^N (Y_i + y_i)^2$ is maximum

c) $\sigma^2 = \sum_{i=1}^N (Y_i - y_i)^2$ is minimum

d) $\sigma^2 = \sum_{i=1}^N (Y_i + y_i)$ is maximum

b-Two pendulum with different masses m_1, m_2 and same string length (L), if you know that $m_2 > m_1$ the period of

a) first pendulum is greater than the second.

b) First pendulum is less than the second .

c) Two pendulum are the same.

$$T = 2\pi \sqrt{\frac{L}{g}}$$



Birzeit University
Physics Department

Physics 111

Name: _____ Student no.: _____

Least Square Method Fit

A student did the Data Regression for the Helical Spring experiment to find the constants K and m_{eff} using the equation $T^2 = 4\pi^2 m/K + 4\pi^2 m_{\text{eff}}/K$.

The results he got are:

x coefficient = 0.33

error in x coefficient = 0.01

constant = 0.005

error in constant = 0.001

find K , ΔK , m_{eff} , Δm_{eff} and their units, knowing that T in seconds, and m in Kg

Δx
 Δb

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{\sqrt{m/K}} + \frac{2\pi}{\sqrt{m_{\text{eff}}/K}}$$

$$y = mx + b$$

$$m = 2\pi$$

$$m = 0.33$$

$$\Delta m = 0.01$$

$$b = 0.005$$

$$\Delta b = 0.001$$

$$y = mx + b$$

$$\Delta y = \pm \left(4\pi^2 \frac{\Delta m}{m} + \frac{\Delta K}{K} + 4\pi^2 \frac{\Delta m_{\text{eff}}}{m} \right)$$

$$K = \frac{y - mx}{T - 0.33x} = \frac{0.33 - 0.33(2\pi)}{-1.74}$$

K	ΔK	m_{eff}	Δm_{eff}

Unit of K =

Unit of m_{eff} =

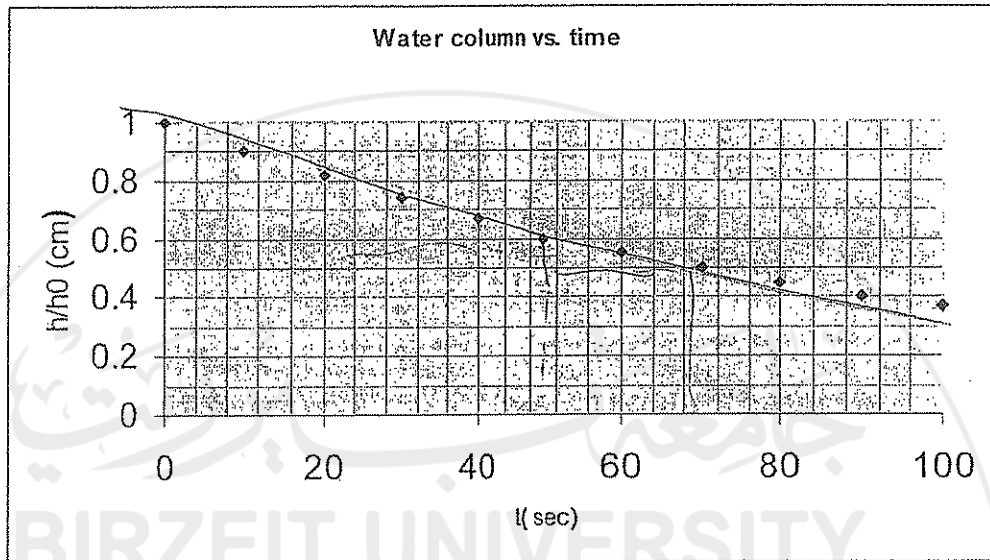


Birzeit University
Physics Department

Physics 111

Name: Osay Ismail Student no.: 1091777

Half life of a draining water column



The above graph shows the relation between the water column height ratio (h/h_0) versus time, where $h = h_0 e^{-\lambda t}$. Using this graph, answer the following questions:

1- What is the value of $t_{1/2}$?

$$\frac{h}{h_0} = e^{-\lambda t} \Rightarrow \ln\left(\frac{h}{h_0}\right) = -\lambda t$$

~~ln(0.5)~~ $\ln(1) = -8 \times 10^{-3} t$

2- What is the value of the decay constant (λ)?

$$\text{slope} = -\lambda \Rightarrow = \frac{0.68 - 0.60}{40 - 50} = -8 \times 10^{-3}$$

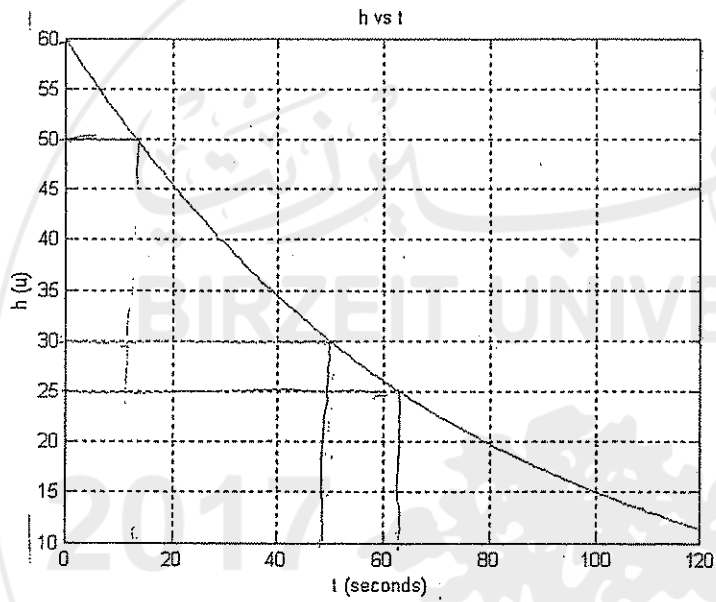
$$\Rightarrow \therefore \lambda = 8 \times 10^{-3}$$

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Birzeit University
Physics Department
Physics111
Quiz

Name: Omar shaheen ID#: 1090279 Section: 3

The following graph shows the relation between the height of a draining water column and time. Answer the following questions.



1) Find h_0 . 60 cm ✓

2) Find $t_{1/2}$. $64 - 16 = 48 \text{ s}$ ✓

3) Find the decay constant (λ).

$$t_{1/2} = \frac{\ln 2}{\lambda}$$

$$48 = \frac{\ln 2}{\lambda}$$

$$\lambda = \frac{\ln 2}{48} = 0.0144 \text{ sec}^{-1}$$



BIRZEIT UNIVERSITY

Physics Department

Physics 111

Quiz

Student Name : YASMIN HABIB Student ID: 1070113

1- Define the half life time of a draining water column?

it is the time that is required to be to the water of water to contain the half quantity of the original quantity.

2- Linearize the following equation (Write in a straight line form):

$$h = h_0 e^{-\lambda t}$$

$$\ln h = \ln h_0 - \lambda t$$

$$y = x + \lambda t$$

$$\ln(h) - \ln(h_0) = -\lambda t$$

$$\ln(h) - \ln(h_0) = -\lambda t$$

What is the slope and the y-intercept of the the linear equation?

Slope = ~~1~~ \uparrow $(-\lambda)$

y-intercept = ~~1~~ $\ln(h_0)$

$\ln(h_0)$

$$\ln(h) = \ln(h_0 e^{-\lambda t})$$

$$\ln(h) = \ln(h_0) + \ln(e^{-\lambda t})$$

$$\ln(h) - \ln(h_0) = \ln(e^{-\lambda t})$$

$$\ln(h) - \ln(h_0) = -\lambda t$$

Slope = ~~1~~ $= -\lambda$

3- What is the aim of today's experiment?

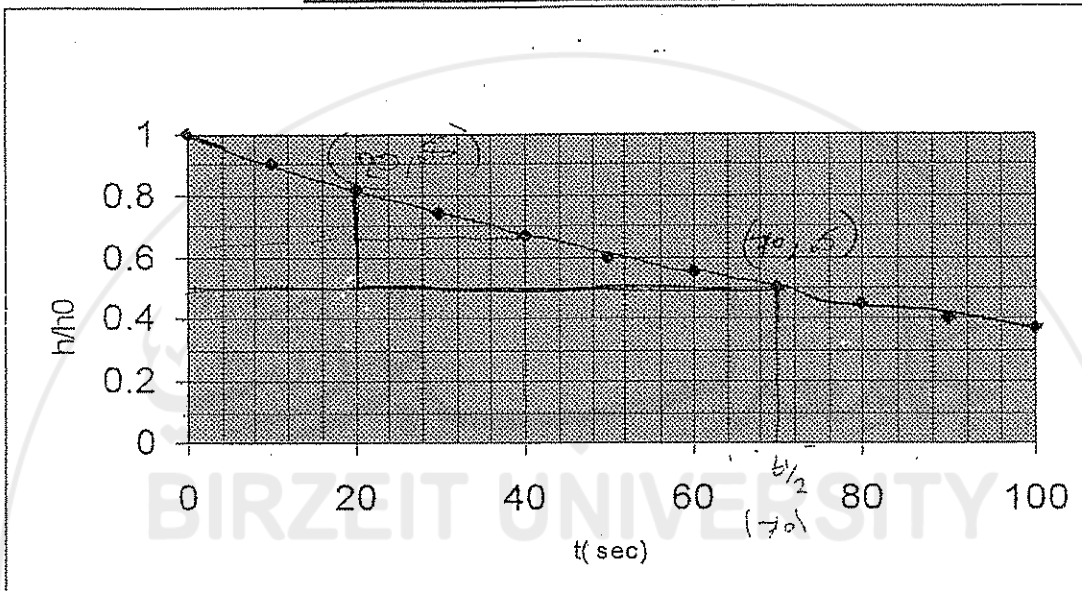


Birzeit University
Physics Department

Physics 111

Name: ~~XXXXXXXXXX~~ Student no.: ~~XXXXXXXXXX~~

Half life of a draining water column



$$h = h_0 e^{-\lambda t}$$

$$\frac{h}{2} = h_0 e^{-\lambda t}$$

$$-\ln(2) = -\lambda t$$

The above graph shows the relation between the water column height ratio (h/h_0) versus time. Using this graph, answer the following questions:

1- What is the value of $t_{1/2}$?

$$h = h_0 e^{-\lambda t}$$

$$\frac{h_0}{2} = h_0 e^{-\lambda t} \Rightarrow \ln(2) = -\lambda t \Rightarrow -\ln(2) = -\lambda t$$

$$+0.693 = +\lambda t_{1/2}$$

$$t_{1/2} = \frac{0.693}{\lambda}$$

$$t_{1/2} = \frac{0.7}{\lambda}$$

$t_{1/2} = 70 \text{ sec.}$

2- What is the value of the decay constant (λ)?

~~$\lambda = \text{slope} = \frac{0.8 - 0.5}{20 - 70} = \frac{0.3}{-50} = -0.006$~~

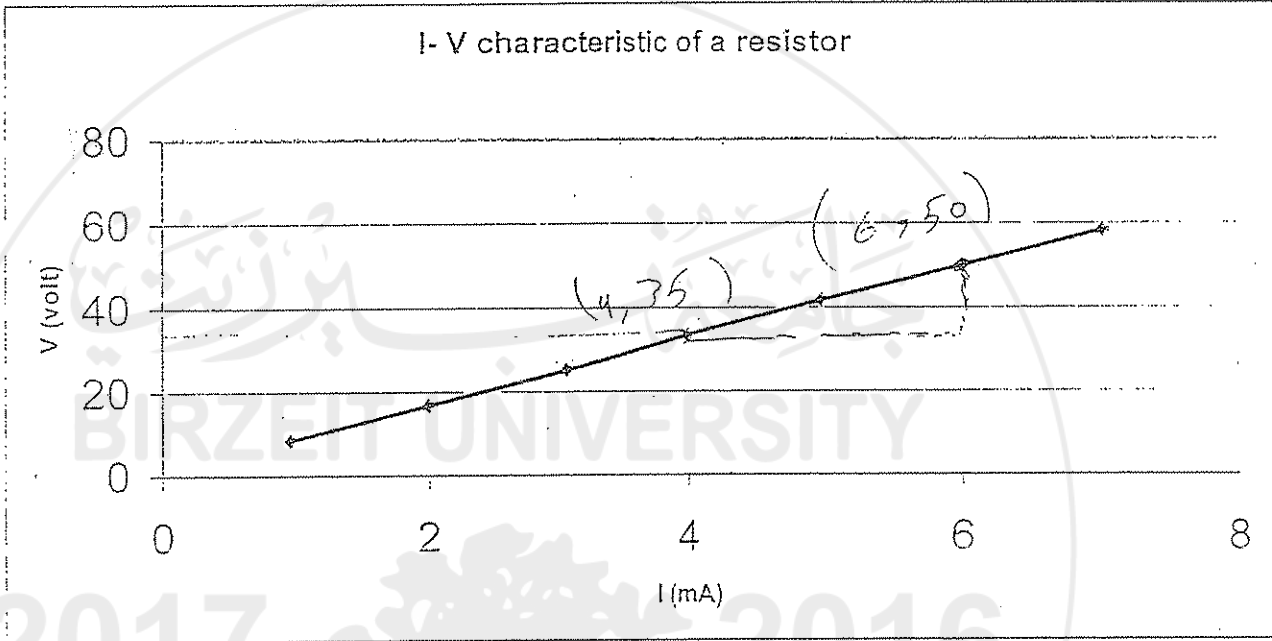
$$t_{1/2} = \frac{0.7}{\lambda}$$

$$\Rightarrow \lambda = \frac{0.7}{t_{1/2}} = \frac{0.7}{70} = 0.01$$

10

Birzeit University
Physics Department

Name: ~~XXXXXXXXXX~~ - Physics 111 Student number: ~~XXXXXXXXXX~~



From the graph shown above, find:

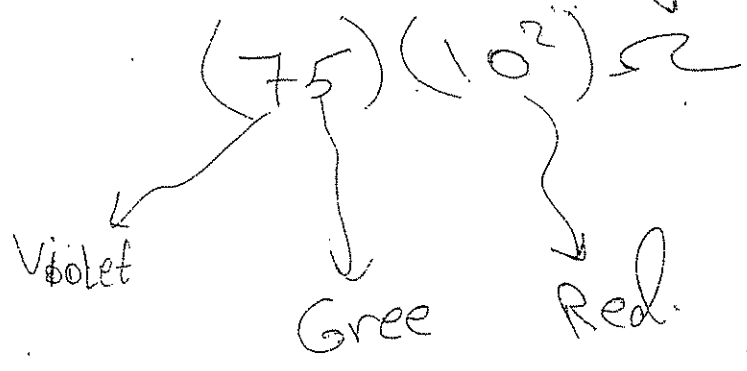
- 1- The slope of the graph. Slope = $\frac{\Delta V}{\Delta I} = \frac{35 - 50}{(4 - 6) \times 10^{-3}} = \frac{-15}{(-2) \times 10^{-3}} = 7500 \text{ V/A}$
- 2- The Value of the resistor. $R = \frac{V}{I} = \frac{35}{4 \times 10^{-3}} = 8750 \Omega$
- 3- The unit of the slope. The slope unit = $\frac{V}{A} \rightarrow \frac{\text{Volt}}{\text{Ampere}}$
- 4- The unit of R. $R = \Omega$ (ohm)

Knowing that the color code key of a resistor is as follows: Black-0, Brown-1, Red-2, Orange-3, Yellow-4, Green-5, Blue-6, Violet-7, Gray-8, White-9. What are the colors of the resistor you got from the graph?

The colors are

- 1- The first color is Violet
- 2- The second color is Green
- 3- The third color is Red

Violet $\Rightarrow (75) \times (10^2) \Omega$



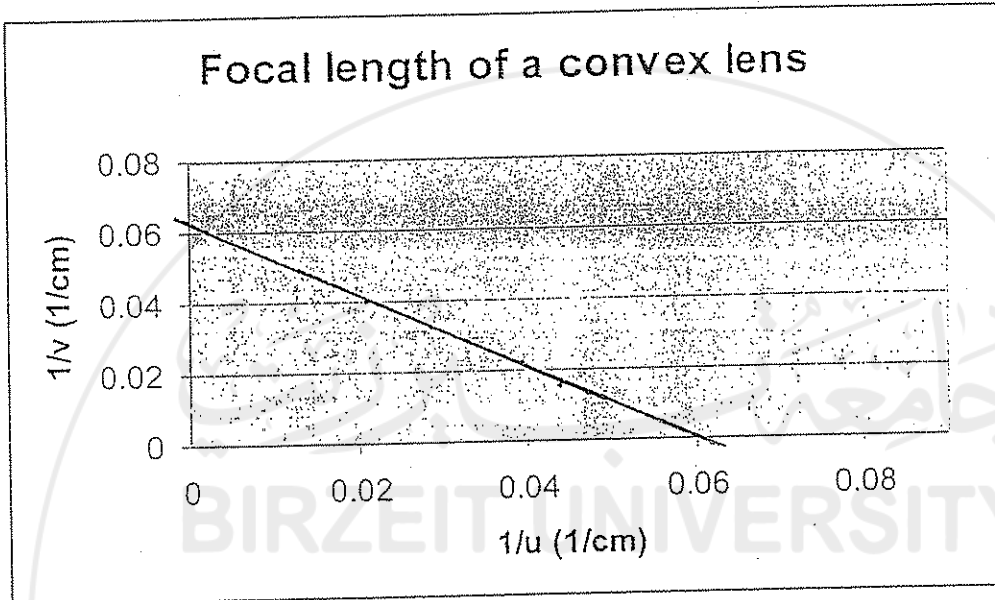
~~Violet~~



Birzeit University
Physics Department

Physics 111

Name: [redacted] Student no.: [redacted]



The graph above shows the relation between $1/v$ (1/cm) vs. $1/u$ (1/cm). Answer the following questions:

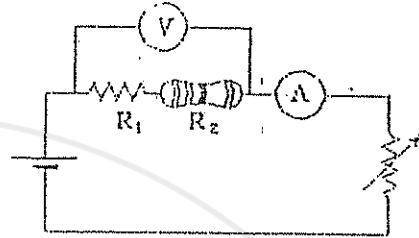
<p>1- The y-intercept =</p> <p>a) 0.08 (1/cm)</p> <p>b) 0 (1/cm)</p> <p>c) 0.065 (cm)</p> <p><input checked="" type="radio"/> d) 0.065 (1/cm)</p>	<p>2- The x-intercept =</p> <p>a) 0.08 (1/cm)</p> <p>b) 0 (1/cm)</p> <p>c) 0.06 (cm)</p> <p><input checked="" type="radio"/> d) 0.06 (1/cm)</p>
<p>3- The focal length of the lens found from the y-intercept =</p> <p>a) 12.5 cm</p> <p><input checked="" type="radio"/> b) 15 cm</p> <p>c) 0.065 cm</p> <p>d) 0.065 (1/cm)</p>	<p>4- The focal length of the lens found from the x-intercept =</p> <p>a) 12.5 cm</p> <p><input checked="" type="radio"/> b) 17 cm</p> <p>c) 0.06 cm</p> <p>d) 0.06 (1/cm)</p>
<p>5- The slope of this line is:</p> <p>a) positive</p> <p><input checked="" type="radio"/> b) negative</p> <p>c) no sign</p> <p>d) it depends</p>	<p>6- The focal length of the lens is:</p> <p><input checked="" type="radio"/> a) positive</p> <p><input type="radio"/> b) negative</p> <p>c) no sign</p> <p>d) it depends</p>
<p>7- If $1/u = .04 \text{ cm}^{-1}$ then $1/v =$</p> <p>a) 0.01 cm^{-1}</p> <p><input checked="" type="radio"/> b) 0.02 cm^{-1}</p> <p>c) 0.03 cm^{-1}</p> <p>d) 0.04 cm^{-1}</p>	<p>8- If $u = 10 \text{ cm}$, then $v =$</p> <p>a) 12 cm</p> <p><input checked="" type="radio"/> b) 17 cm</p> <p><input checked="" type="radio"/> c) 150 cm</p> <p>d) No real image</p>

PHYSICS LAB 111

Quiz # 3

Name : <u>Abdullah</u>	Section #: <u>12</u>
Student #: <u>2001020</u>	Date : <u>3-3-2004</u>

Black	0	None	± 20%
Brown	1	Silver	± 10%
Red	2	Gold	± 5%
Orange	3	Red	± 2%
Yellow	4		
Green	5		
Blue	6		
Violet	7		
Gray	8		
White	9		

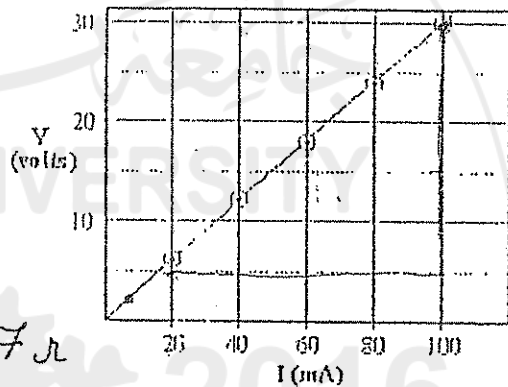


$R_2 = \text{B...y...Black...G..}$

Brown yellow Black

Gold

In the adjacent plot several voltages (V) and their corresponding currents (I) are recorded for the circuit shown above. Use the plot to find the value of R_1 .



~~14 x 10^-3 ± 5%~~

~~14~~

$14 \times 10^{-3} \pm 5\% = 14 \pm 0.7 \Omega$

When $V = 30$, $I = 100$ / from graph

$R = \frac{30}{100} = 0.3 \Omega$

$R = R_1 + R_2$

$0.3 = R_1 + 14$

$\implies R_1 = 13.7 \Omega$

3

What is the aim of the experiment you are going to perform today?

slope = $\frac{\Delta V}{\Delta I} = \frac{30 - 20}{100 - 65} = \frac{10}{35} =$

~~$R = R_1 R_2$~~
 ~~$R_1 + R_2$~~



$$\tau = RC$$

$$C = \frac{Q}{V}$$

Birzeit University
Physics Department
Physics 111

Name: [REDACTED] Student number: [REDACTED]

1. In RC circuit, $R = 1 \text{ M Ohm}$, $C = 22 \text{ Micro Farad}$, Find the Time constant τ .

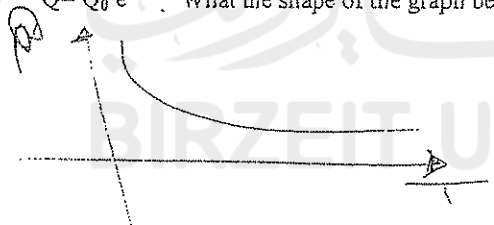
$$\tau = RC = (1 \times 10^6)(22 \times 10^{-6}) = 22 \text{ s}$$

(15)

2. In RC circuit with a constant C, how can we increase the time constant?

we can increasing R
 \Rightarrow then the time constant will increase.

3. $Q = Q_0 e^{-t/RC}$ What the shape of the graph between Q and t?



4. What should we do to get a straight line while drawing a graph that shows the relation between the Voltage of the capacitor and the time (Voltage vs. time)?

we used semi log graph
 on x-axis Time
 and on y-axis $\log V$ \Rightarrow This implies to make
 the graph (V vs. T) as a straight line.

✓

9.5

Birzeit University
Physics department
Physics 111

Quiz

Student name:- Moath Hamad

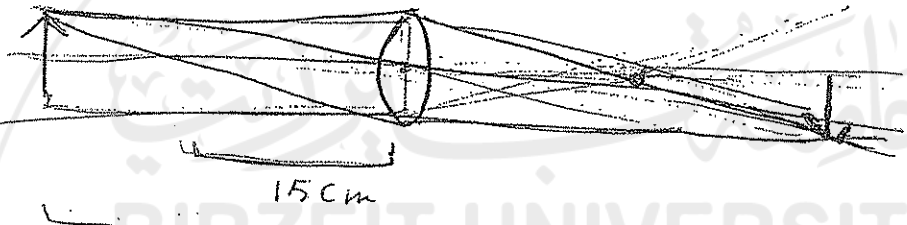
Student ID:- 10910596

section:- 4

Q1:

Suppose you have a convex lens which has focal length 15.00cm and you put an object 20.0 cm apart from the lens and if you given the uncertainty in focal length 0.15cm and the uncertainty in the object distance 0.2cm, find the image distance and its uncertainty?

2.5
3



$$\frac{1}{v} = -\frac{1}{u} + \frac{1}{f} \Rightarrow \frac{1}{v} = -\frac{1}{20} + \frac{1}{15} = 0.017$$

$f = 15 \times 10^{-2}$
 $u = 20 \times 10^{-2}$
 $\Delta f = 0.15 \times 10^{-2}$
 $\Delta u = 0.2 \times 10^{-2}$
 $v = ? \Rightarrow \Delta v = ?$
 $v = 58.8$
 $\frac{\Delta v}{v} = \frac{\Delta u}{u} + \frac{\Delta f}{f}$

Q2:- Calculate the half life time from the following curve Then Write $y = h_0 e^{-\lambda t}$, you have to find h_0 and λ .

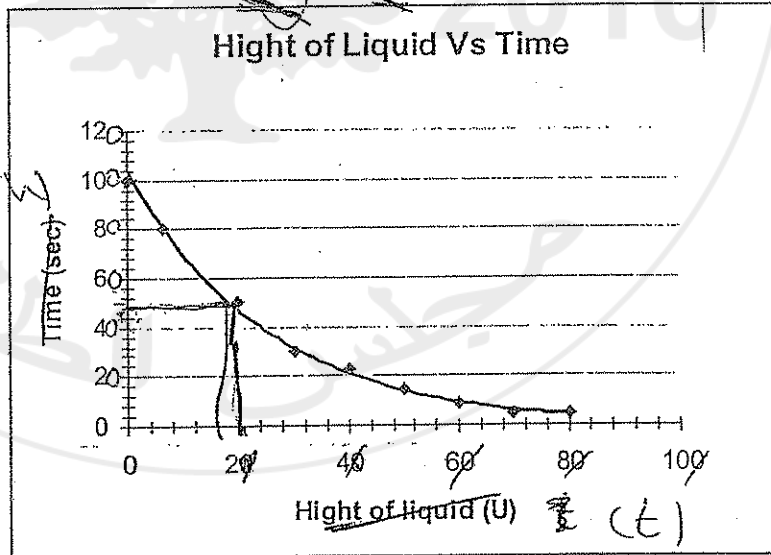
$h_0 = 100$

at

$h = 50$

$t = 2 \text{ sec}$

this is the half life time.



$h_0 = 100$ at $t = 0$ $t_{1/2} = \frac{\ln 2}{\lambda}$

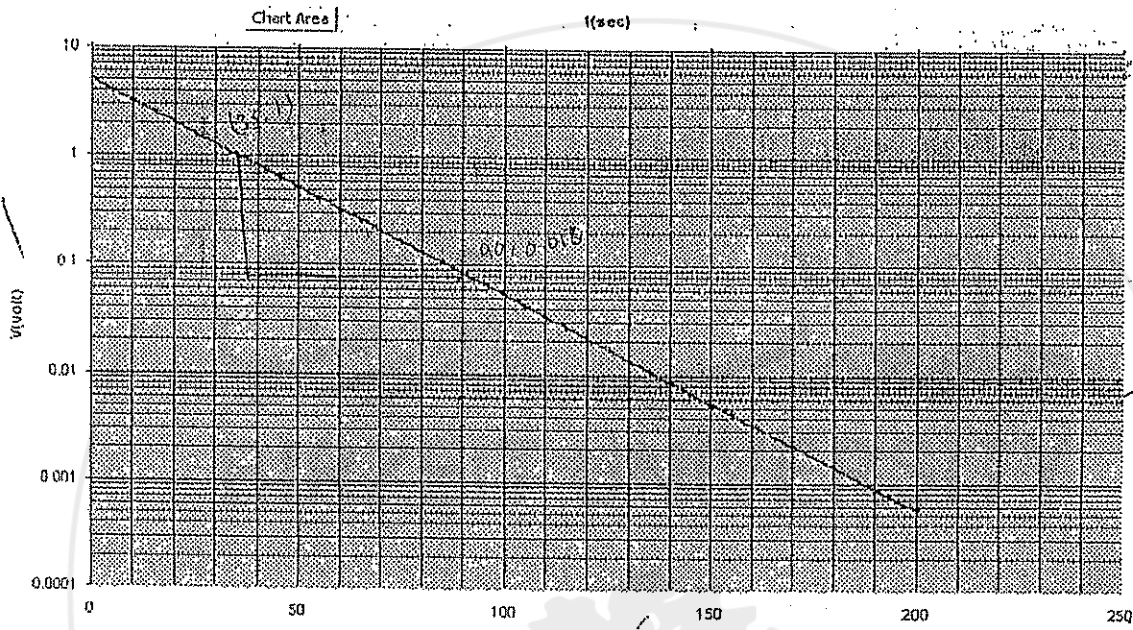
we can take a special point at $t_{1/2}$ and $\frac{1}{2} h_0$

then

$$\frac{1}{2} h_0 = h_0 e^{-\lambda t_{1/2}} \Rightarrow \frac{1}{2} = e^{-\lambda t_{1/2}}$$

$$\ln(1) - \ln(1/2) = -\lambda t_{1/2}$$

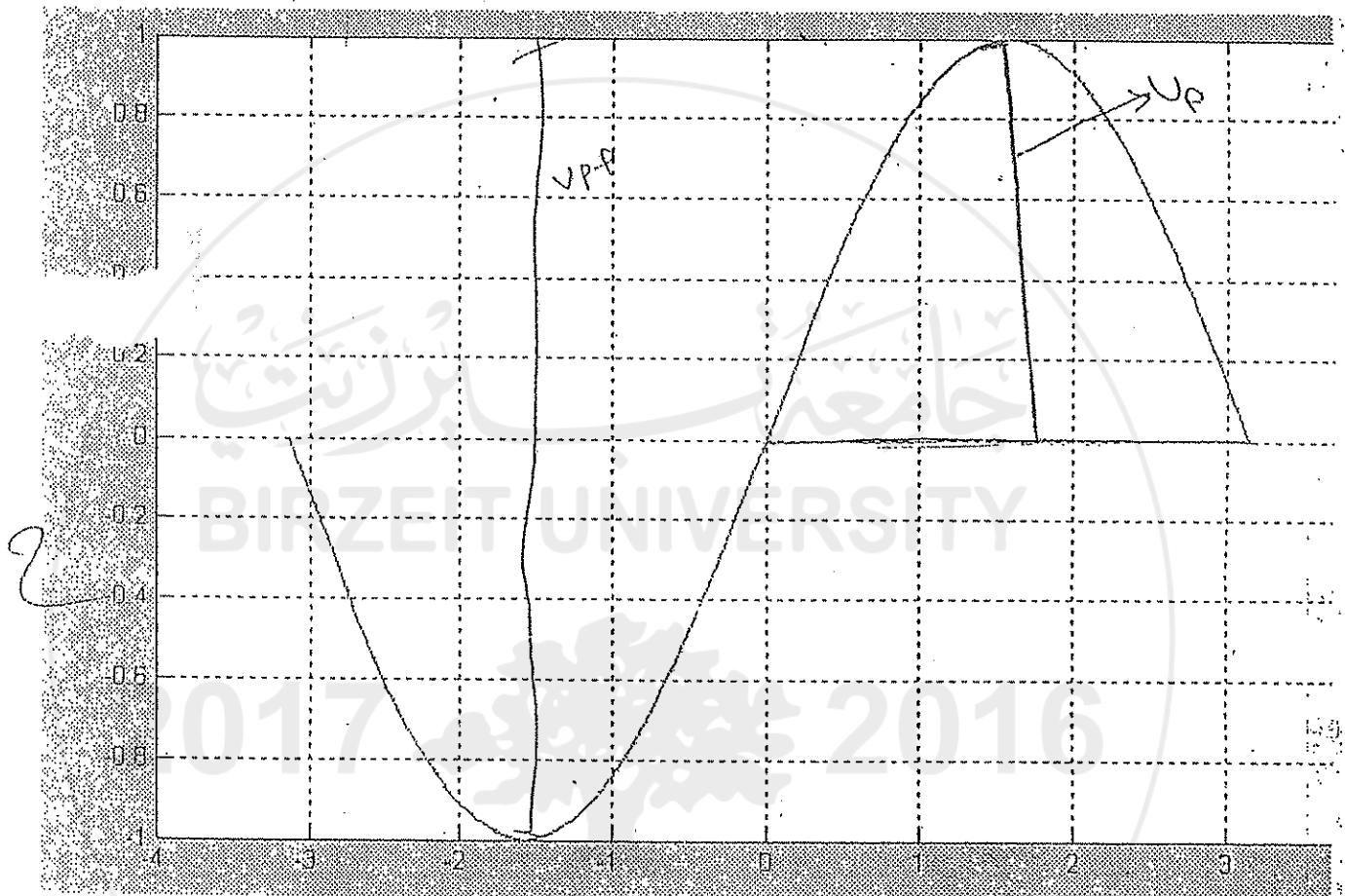
Q2) The following graph (on semi-log graph paper) is V vs t
 V= the decaying voltage of the capacitor
 Find: the time constant τ and the maximum voltage ϵ



$T_{TSR} = \text{slope} = \frac{\ln 1 - \ln 0.013}{(35-90)} = -0.07$

مجلس الطلبة

Q3) For the CRO graph (voltage multiplier = 2v/div; time base = 50 μsec)



- find the amplitude of the wave
- It's frequency

a) ~~Up = 5 × 0.2 = 1 volt/div~~ $U_p = 5 \times 0.2 = 1 \text{ volt/div}$

b) $F = \frac{1}{T} \Rightarrow \frac{1}{50 \times 10^{-3}} = 2 \times 10^4 \text{ هرتز}$

~~Handwritten scribbles~~ -2

6/10

Birzeit University
Physics Department

Student name: -yazeed Physics 111
Student ID: -1092567

Section: - 3

Q1:-

a- Convert the exponential equation $Y = Ae^{-\lambda t}$ into a linear equation, then determine the slope and Y-intercept.

الارتفاع
تبع
الوقت

الارتفاع
تبع
الوقت

~~Handwritten derivations:~~

$$y = Ae^{-\lambda t}$$

$$\ln y = \ln A + \ln e^{-\lambda t}$$

$$\ln y = \ln A - \lambda t$$

$$y' = -\lambda A e^{-\lambda t}$$

$$y' = -\lambda y$$

Y-intercept = C

b- What is the unit of λ ?

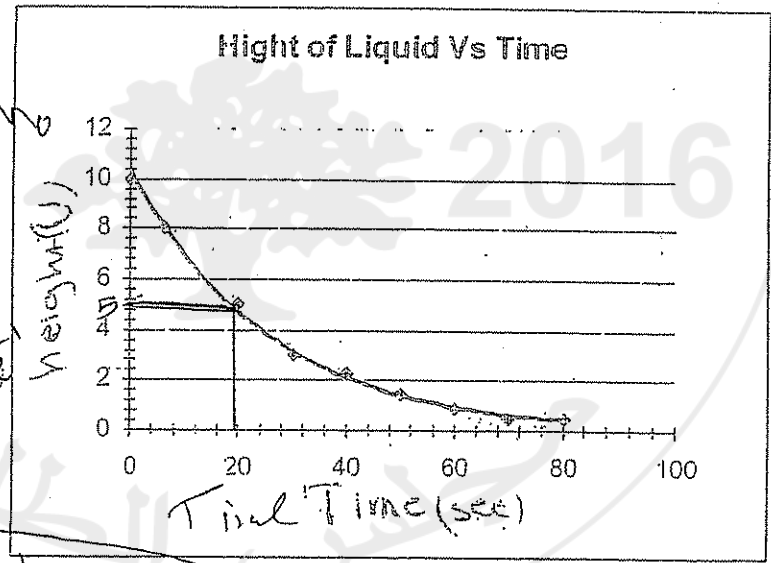
~~Handwritten work:~~ $\text{sec}^{-1} \times \text{sec}$ i.e. unitless

Q2:- Calculate the half life time from the following curve
Then Write $y = h_0 e^{-\lambda t}$, you have to find h_0 and λ .

~~Handwritten:~~ $t_{1/2} = 20 \text{ sec}$

~~Handwritten:~~ $\lambda = \frac{\ln 2}{t_{1/2}}$

~~Handwritten:~~ $\lambda = \frac{\ln 2}{20} = 0.03 \text{ sec}^{-1}$



~~Handwritten:~~ $y = h_0 e^{-\lambda t}$

~~Handwritten:~~ $y = h_0 e^{-\lambda t}$

~~Handwritten:~~ $5 = h_0 e^{-0.03 \times 20}$
 $5 = h_0 e^{-0.6}$
 $h_0 = 5 e^{0.6} = 10$

~~Handwritten:~~ $y = 5 e^{-0.03(20)}$

~~Handwritten:~~ $y = 5 e^{-0.69}$

~~Handwritten:~~ $y = 2.5$

~~Handwritten:~~ $1 = 5 e^{-0.69 t}$

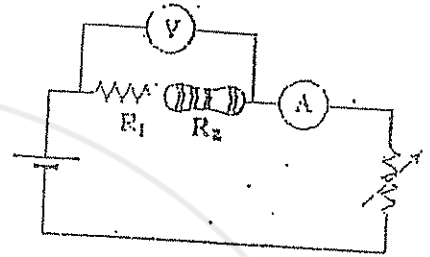
~~Handwritten:~~ $h_0 = \frac{10}{2} = 5$ $h_0 = ?$ $h_0 = 10 \text{ unit of length}$

PHYSICS LAB 111

Quiz # 3

Name : ~~XXXXXXXXXX~~
 Student # : ~~XXXXXXXXXX~~ Section #: ~~10.2~~
 Date: ~~XXXXXXXXXX~~

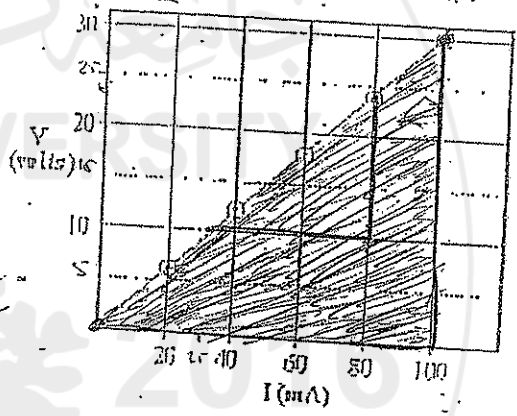
Black	0	None	± 20%
Brown	1	Silver	± 10%
Red	2	Gold	± 5%
Orange	3	Red	± 2%
Yellow	4		
Green	5		
Blue	6		
Violet	7		
Gray	8		
White	9		



$R_2 = \text{Brown yellow Black, gold}$

$R = 140 \pm (140 \times 5\%)$
 $R = 140 \pm 7 \Omega$
 In the adjacent plot several voltages (V) and their corresponding currents (I) are recorded for the circuit shown above. Use the plot to find the value of R_1 .

$R = \text{slope} = \frac{\Delta V}{\Delta I}$
 $R = \frac{30 - 0}{(100 - 0) \times 10^{-3}} = 300 \Omega$

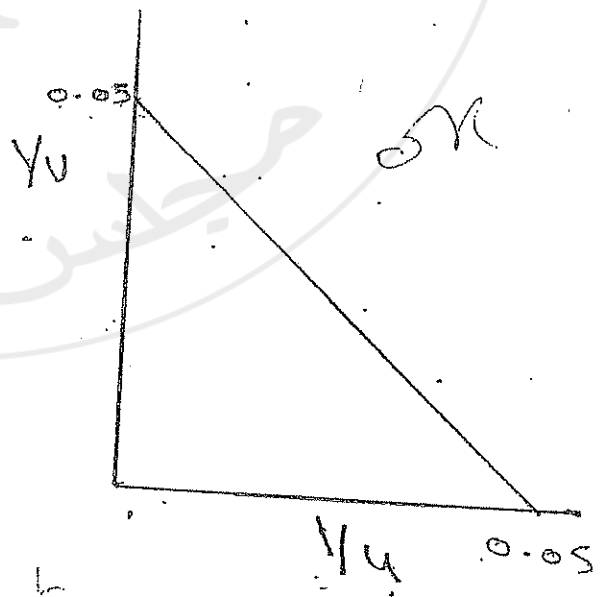


2) From the graph find f

$\frac{1}{f_y} = \frac{1}{v} = 0.05 \left(\frac{1}{4} = 0\right)$
 $f_y = v = \frac{1}{0.05} = 20$

$\frac{1}{f_x} = \frac{1}{u} = 0.05 \left(\frac{1}{4} = 0\right)$
 $f_x = u = \frac{1}{0.05} = 20$

$f = \frac{f_x + f_y}{2} = 20 \text{ cm}$



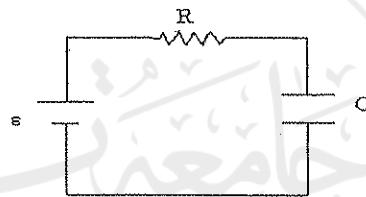
Birzeit University
 Physics Department
 Physics 111.
 Quiz

2

Name: ~~XXXXXXXXXXXXXXXXXXXX~~ No.: ~~XXXXXXXXXX~~ Section: 2

The voltage across a certain capacitor in an RC circuit is described by the following equation:

$$V(t) = 5.0(1 - e^{-45.45t})$$



where $V(t)$ is the voltage across the capacitor in volts at time (t) in seconds.

- 1) Does this equation represent charging or discharging process?

The equation represents a charging process.

- 2) find the time constant (τ).

~~$\tau = RC$~~

~~$\tau = \frac{V}{I}$~~

~~$\tau = \frac{Q}{I}$~~

~~$\tau = \frac{Q}{I} = \frac{CV}{I}$~~

~~$\tau = \frac{Q}{I} = \frac{Q}{\frac{Q}{RC}} = RC$~~

$\tau = \frac{1}{45.45} = 0.022$

$1 - e^{-45.45t} = 0.63$

$e^{-45.45t} = 0.37$

- 3) If $R=1K\Omega$, find the value of C.

~~$\tau = RC$~~

~~$C = \frac{R}{\tau}$~~

$C = \frac{\tau}{R}$

BIRZEIT UNIVERSITY
PHYSICS DEPARTMENT
PHYS111
Quiz

Name: ~~XXXXXXXXXXXX~~ No.: ~~XXXXXX~~ Section: 2

In figure 1, the reading of the voltmeter is (2 volts) and the reading of the ammeter is (40mA). In figure 2, the reading of the voltmeter is (2 volts) and the reading of the ammeter is (16mA). Find R_1 and R_2 .

* ~~$R_1 = \frac{I}{V} = \frac{40 \times 10^{-3}}{2} = 20 \times 10^{-3} \Omega$~~

~~$R_s = R_1 + R_2 = 16 \times 10^{-3} \Omega$~~

$R_1 = \frac{V}{I} = \frac{2}{40 \times 10^{-3}} = 50 \Omega$

$R_s = R_1 + R_2 = \frac{V_{total}}{I} = \frac{2}{16 \times 10^{-3}}$

$R_1 + R_2 = 125$
 $50 + R_2 = 125 \Rightarrow R_2 = 125 - 50 = 75 \Omega$

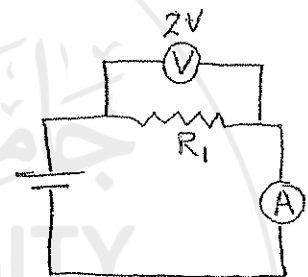


Figure 1

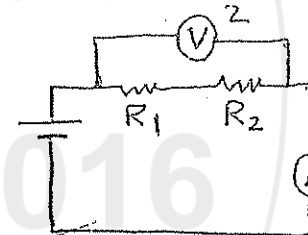


Figure 2

In figure 3, if $u = 30.0\text{cm}$ and $v = 60.0\text{cm}$, find the focal length (f) of the lens.

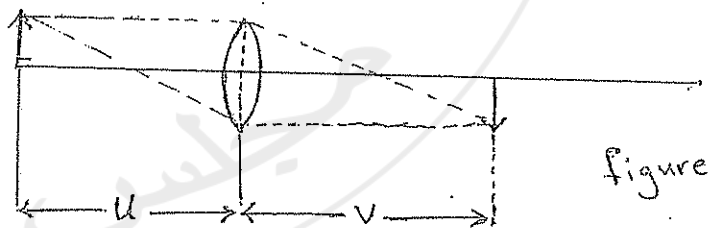


Figure 3

$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

$\frac{1}{f} = \frac{1}{30} + \frac{1}{60} =$

$= 0.0333 + 0.01667 = 0.05$

$\frac{1}{f} = 0.05$

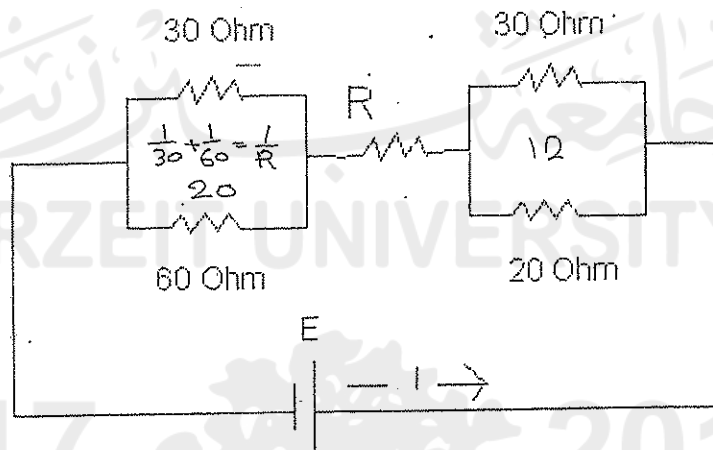
$f = \frac{1}{0.05} = 20.0 \text{ cm}$

Quiz Physics lab 111

Student name:

ID:

- For the following circuit find the value of (R) if the value of E is 10 volts and the value of I is 0.2 Ampere.



$$R + 12 + 20 = \frac{10}{0.2}$$

$$R + 32 = 50$$

$$R = 18$$

200

120

320

V = 10

I = 0.2

$$50 = 23 + R$$

$$\frac{1}{20} + \frac{1}{30}$$

$$\frac{30}{60000} =$$

$$\frac{1}{120}$$

- What's the aim of today's experiment?

Quiz #3
Physics Lab 111

1. Carbon 14 (C_{14}) is used to determine the age of fossils; its decay is given by:

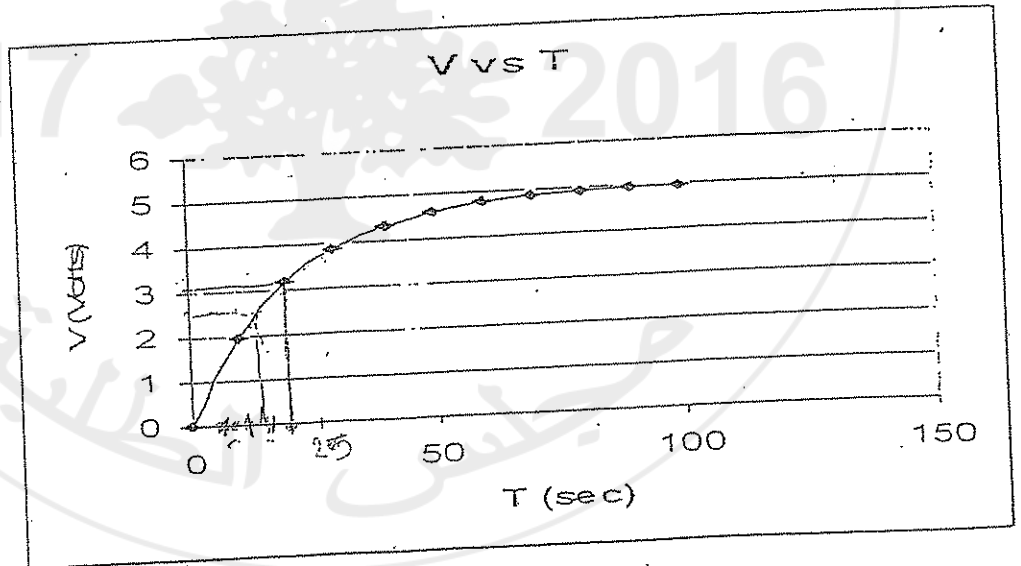
$N(t) = N_0 e^{-\alpha t}$

Where $N(t)$ is the number of remaining atoms at a time t ; the half life time for (C_{14}) is 5730 years.

- Find the decay constant for (C_{14}).
- What's the time required obtain half the original number of atoms (C_{14})?
- What's the time required to have a quarter of the original number of atoms (C_{14}) undecayed?

$\frac{N_0}{2} = N_0 e^{-\alpha(5730 \text{ years})}$

2. A capacitor is connected in series with a resistance and voltage source that supplies the circuit with 5 volts DC, if we obtained the following graph for the charging case:



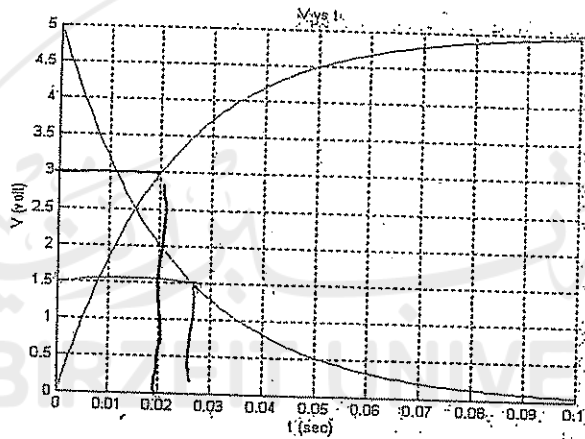
- Find the time constant of the circuit.
- If the given resistor in the circuit is 1M ohm what is the value of the capacitor used?
- Find the time required to charge the capacitor to half of its maximum value.

0.4576
0.457

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Physics Department
Physics 111
Quiz # 3

Name: _____ No.: _____ section: _____

The graph shows the voltage on a capacitor vs time in an RC circuit in both charging and discharging processes.



1) Find the time constant from the charging curve (τ_c).

charging
 $\tau_c = RC = 0.02 \text{ sec}$
charging

$V_{max} = 5 \times 0.63 = 3.15$
 $t = 0.02$

2) Find the time constant from the discharging curve (τ_d).

$\tau = 0.025 \text{ sec}$

$V_{max} = 5 \times 0.37 = 1.85$

3) If $R=1\text{Kohm}$, find the value of C.

$R=1000 \Omega$

$\tau_c = RC$
 $\frac{0.02 + 0.025}{2} = 1000 \times C$

4) Find the half life time and λ for the discharging curve.

$t_{1/2} = \tau \ln 2$

5) Explain the relation between λ and time constant τ in the discharging curve.

$\frac{1}{\tau} = \frac{\ln 2}{\tau} , \tau = \frac{1}{\lambda}$

$\lambda = \frac{\ln 2}{\tau}$



Birzeit University
Physics Department

Physics 111

Name: Deema...IBrahim...Hamad Student number: ...10.9027...²

1. In RC circuit, $R = 1 \text{ M Ohm}$, $C = 22 \text{ Micro Farad}$, Find the Time constant τ .

$$\tau = RC$$

$$R = 1 \times 10^6 \text{ Ohm}$$

$$\Rightarrow \tau = 1 \times 10^6 \times 22 = 2.2 \times 10^5 \text{ sec}$$

$$1 \text{ M Ohm} = 10^6 \text{ Ohm}$$

10

2. In RC circuit with a constant C , how can we increase the time constant?

$\tau = RC$ if C constant \Rightarrow the time constant will increasing when R -increasing

3. $Q = Q_0 e^{-t/RC}$, What is the shape of the graph between Q and t ?



4. What should we do to get a straight line while drawing a graph that shows the relation between the Voltage of the capacitor and the time (Voltage vs. time)?

~~RC circuit~~ dis change of RC circuit and drawing data

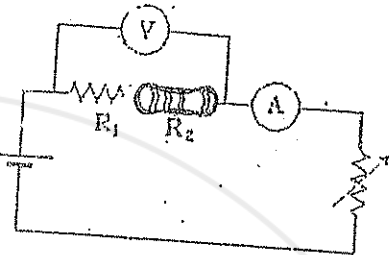
PHYSICS LAB 111

Quiz # 3

Name : Doha sharha
 Student # : 1110739

Section # :
 Date :

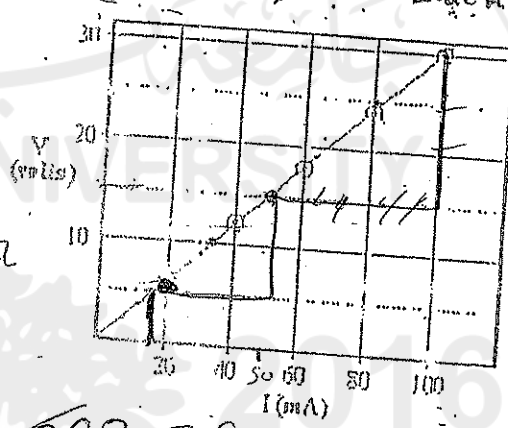
Black	0	None	± 20%
Brown	1	Silver	± 10%
Red	2	Gold	± 5%
Orange	3	Red	± 2%
Yellow	4		
Green	5		
Blue	6		
Violet	7		
Gray	8		
White	9		



Black + Gold
 Brown x yellow x 10

$14 \times 10 + 5\% = 14 + 0.7 = 14.7$
 $R_2 = \text{Brown Yellow Black Gold}$

In the adjacent plot several voltages (V) and their corresponding currents (I) are recorded for the circuit shown above. Use the plot to find the value of R_1 .



$\frac{\Delta V}{\Delta I}$

$R_s = \frac{15 - 5}{50 - 20} = \frac{10}{30 \times 10^{-3}} = 333.3 \Omega$

$R_s = 312.5 \Omega$

$R_1 = R_s - R_2 = 312.5 - 12.5 = 298.5 \Omega$

2) From the graph find R_1

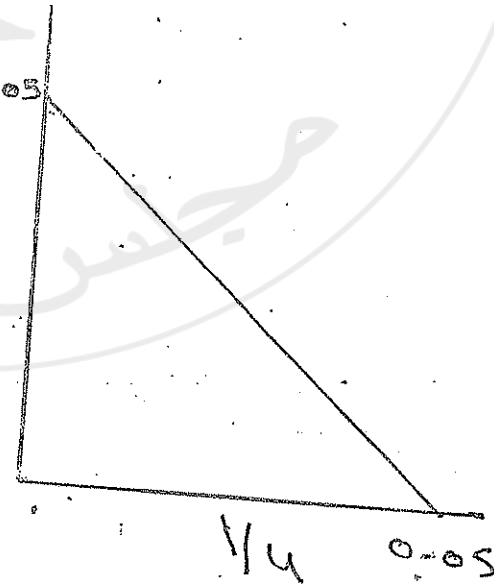
$f_y = \frac{1}{0.05} = 20 \text{ cm}$

$f_x = \frac{1}{0.05} = 20 \text{ cm}$

$\frac{f_x + f_y}{2} = 20$

$\frac{1}{f} = \frac{1}{4} + \frac{1}{u}$

$\pm (5 \times 14)$



Birzeit University
Physics 111
Quiz

(X)

✶

Student name:
Student ID:

Section:

Q1: Suppose you have a convex lens which has focal length 15cm and you put an object in front of it so that the distance between the object and lens 20cm where will the image produce?

$f = 15 \text{ cm}$
 $u = 20 \text{ cm}$

$\frac{1}{15} = \frac{1}{20} + \frac{1}{v}$
 $\frac{1}{15} = \frac{20+v}{20v}$

$20v = 300 + 15v$
 $5v = 300$
 $v = 60 \text{ cm}$

$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
 $\frac{1}{15} = \frac{1}{20} + \frac{1}{v}$

$\frac{1}{15} =$

$\frac{1}{v} = \frac{1}{15} - \frac{1}{20} \Rightarrow v = 60 \text{ cm}$

Q2: Student do experiment no. 5 the following data was obtained:
 $F=14.774 \text{ cm}$, $u=20\text{cm}$, $v=30\text{cm}$, $\Delta u=\Delta v=0.2\text{cm}$. Calculate the uncertainty in f (Δf)
And write the final result as $f \pm \Delta f$

$f = 14.774 \text{ cm}$
 $u = 20 \text{ cm}$
 $v = 30 \text{ cm}$

$\Delta f = ?$

$\Delta F = F^2 \left[\frac{\Delta v}{v^2} + \frac{\Delta u}{u^2} \right]$

$(14.774)^2 \left[\frac{0.2}{30^2} + \frac{0.2}{20^2} \right]$

$\Delta u = \Delta v = 0.2 \text{ cm}$

$\frac{\Delta f}{f^2} = \frac{\Delta u}{u^2} + \frac{\Delta v}{v^2}$

$\Delta f = \frac{f^2}{(14.774)^2} \left(\frac{0.2}{20^2} + \frac{0.2}{30^2} \right)$

$\frac{\Delta f}{f} = \frac{\Delta u}{u} + \frac{\Delta v}{v}$

Q3: What is the physics law you will apply today?

$\Delta f = 0.157$
 ≈ 0.2

2017 2016

مجلس الطلاب

Birzeit University
Physics Department
Physics Lab 111
Quiz

Student Name:

Student ID:

1. It's known that the speed of light in vacuum is 3×10^8 m/s, and it is known that in plastic the speed of light is 2.06×10^8 m/s, find the index of refraction of plastic.

$$n = \frac{3 \times 10^8}{2.06 \times 10^8} = 1.4$$

Q2: Put a circle around the correct answer:

In the method of least square fit the expression for the best line is derived from:

$\sigma^2 = \sum_{i=1}^N (Y_i - y_i)$ is minimum

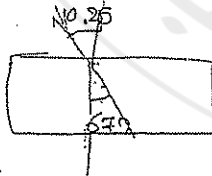
$\sigma^2 = \sum_{i=1}^N (Y_i + y_i)^2$ is maximum

$\sigma^2 = \sum_{i=1}^N (Y_i - y_i)^2$ is minimum

$\sigma^2 = \sum_{i=1}^N (Y_i + y_i)$ is maximum

$\sum (Y_i - y_i)^2$ is minimum

3. A beam of light passes from air to a block of glass. If the angle of incident is 10.25° and the angle of refraction is 6.72° . Find the index of refraction of the glass giving that the index of refraction of air is 1.



$$n_a \sin 10.25 = n_g \sin 6.72$$

$$n_g = 1.52$$