BIRZEIT UNIVERSITY

Faculty of Science كلية العلوم

Department of Physics دائرة الفيزياء

Phys111 Report

Experiment #3: Density of a Liquid

Name:	Bayan Saleem Alkamel	**ID #:**	1231030
Partner:		**ID #:**	
Section:	12		
Date:			

(1) Abstract:

- **Aim of the experiment:**

To find the density of a liquid (paraffin oil)

- **The main result is:**
  - The density of the liquid is $\rho = 0.83 \pm 0.07 \frac{g}{cm^3}$

(2) Data:

	1.	2.	3.	4.	5.	6.
$L_1\ (cm)$	2.2	3.1	6.2	7.8	9.1	12.3
$L_2\ (cm)$	2.5	3.8	7.1	9.2	10.8	13.4

Δ_1 =0.1 cm	Δ_2 =0.2 cm	Δ_3 =0.1 cm

(3)Calculations:

$\bar{L}_1 = 6.783333333\ cm$	$\Delta\bar{L}_1 = \Delta_3 + \Delta_2 = 0.3\ cm$
$\bar{L}_2 = 7.8\ cm$	$\Delta\bar{L}_2 = \Delta_1 + \Delta_2 = 0.3\ cm$

$$\rho = slope = \frac{\Delta\bar{L}_1}{\Delta\bar{L}_2} = \frac{13.3 - 1.1}{15.6 - 0.93} = 0.831629175\ \frac{g}{cm^3} \approx 0.83$$

$$\frac{\Delta\rho}{\rho} = \frac{\Delta\bar{L}_1}{\bar{L}_1} + \frac{\Delta\bar{L}_2}{\bar{L}_2} \gg \frac{\Delta\rho}{0.831629175} = \frac{0.3}{6.783333333} + \frac{0.3}{7.8}$$

$$\Delta\rho = 0.068765406\ \frac{g}{cm^3} \approx 0.07$$

(4)Results:

- The density of the liquid is $\rho = 0.83 \pm 0.07\ \frac{g}{cm^3}$

(5)Conclusions:

ρ = 0.83 ±0.07 → the liquid is paraffin.

Discrepancy test→ | True value - Exp.value | ≤ 2ΔR

→ | 0.82-0.83 | ≤ 2×0.07 → 0.01≤0.14 → so, the result is accepted.

The result is accepted, the value I measured is very close to the true value. The actual density of the paraffin oil is 0.82 g/cm3, which is very close to the result of our experiment, which is 0.83 g/cm3. Its due to many possible reasons:

- **The way that the measurements was took is accurate (note that the measurements has taken from the photos).**
- **I focused on taking measurements perfectly, by using a ruler.**

There are many mistakes that I could have made if I had not measured properly.

-But my results not identical this difference can be attributed to various reasons, including the presence of some dirt in the tube, although we used alcohol to clean the tube, but there is still a little dirt that affects the result. Also, the meters that were installed on the sides of the pipe are not exactly at the same level, so the data was not completely accurate. It is also important to wait for one minute before taking measurements. This allows the liquid to settle. This waiting period allows any air bubbles or disturbances caused by the liquid to dissipate, which could lead to an inaccurate reading. (This was one of our mistakes.)

L1 VS L2

TWO POINTS

a(0.93,1.1)

b(15.6,13.3)

Slope=ΔL1/ΔL2

=(13.3-1.1)

(15.6-0.93)

=0.834355828g/cm³