**Experiment No. (4)**

**(( Calculation of Atmospheric pressure through column weight ((measurements of compressed air**

**The theoretical part:**

The atmospheric pressure can be calculated using a device that is a glass tube with a length of 70 cm. The inner diameter of the bottle is 2 mm closed from one end. The device contains a column of compressed air inside the device and also contains mercury trapped inside the bottle. The length of mercury may reach about 20 cm. movement of mercury.

**The method of work:**

The device is placed vertically and installed on a wall or wall, where lines are drawn vertically, on which the device is placed vertically with the points and represents the beginning of points A and the end of B. After installing the device, we determine the angles to be extracted atmospheric pressure, where the values of the angles were determined to be two or more angles.

After that, you calculate the atmospheric pressure by changing the position of the device according to the required angle, and then we extract the values of the table as:

 The distance of the compressed air column inside

the device, measured in( cm ) .

The distance of mercury inside the device, 

measured in ( cm ) .

After installing the device on the angle to be measured, the compressed air column is calculated using a ruler, and the mercury value is also extracted using a ruler, Also the total atmospheric pressure can be calculated according to the following equation:

**Total Atmospheric pressure (cm ) = *H + Lcos θ***

where is: ***H*** the value of atmospheric pressure measured in mercury

When we apply Boyle's equation to a mass of air:



We get:

as well 



When we place the device on a place, for example, the wall of the laboratory and vertically so that its open end is facing up, the measurement is made For the air column under pressure *(H + L), W*hen we change the position of the device (i.e. change the *angle), the measurement is made*  under new pressure *(H - L).*

Applying Boyle's law we get:





|  |  |  |  |
| --- | --- | --- | --- |
|  | Length of air colmn(AB) |  | Angle of |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |





