LAB 2

Determination of Specific Gravity

Calculation

- Height of the glycerol = 222 mm

- Height of the water = 263 mm

- Mass of the liquid (glycerol) = 0.0739 Kg

- Mass of the water = 0.0484 Kg

- Specific gravity (relative density)

$$\text{Specific gravity (relative density)} = \frac{\text{Height of water}}{\text{Height of Glycerol}}$$

Or

$$\text{Specific gravity (relative density)} = \frac{263}{222}$$

Or

$$\text{Specific gravity (relative density)} = 1.184$$

- Theoretical value of Specific gravity of the glycerol = 1.26331 (Physical Properties of Glycerine, n.d.)

- Percentage error

$$\text{Percentage error} = \left| \frac{\text{(Eperimental specific gravity)} - \text{(Theoretical specific gravity)}}{\text{(Theoretical specific gravity)}} \right| * 100$$

Or

$$\text{Percentage error} = \left| \frac{1.184 - 1.26331}{1.26331} \right| * 100$$

Or

$$\text{Percentage error} = 6.278 \%$$

Discussion

The experimental value of specific gravity of glycerol is 1.184 and theoretical value of glycerol at room temperature is 1.26331. The value of theoretical specific gravity and specific gravity are different. The percentage error in the experimental value is 6.278 %. The value of percentage error less than 10 % is acceptable because of this, this value is reasonable and this

experiment has high accuracy. It demonstrates the precision of the experiment's findings. The primary source of error may be inaccuracy in recording the height of water and glycerol level or air bubbles in the fluids. The errors may have been also caused by the assumptions that there is no friction between the tube and fluids or room temperature is constant or no capillary action in the tube.

Conclusion

The goal of this experiment is to compare calculated and theoretical findings in order to determine the test liquid's specific gravity in relation to water. The goal of the experiment has been achieved. The experimental results are highly precise and accurate. The accuracy of the result may be impacted by the inaccuracy in recording the height of water and glycerol level or air bubbles in the fluids or the assumptions that there is no friction between the tube and fluids or room temperature is constant or no capillary action in the tube. To improve the accuracy of the experiment, Parallax errors should be avoided to improve the accuracy of experiment during the recording of height of liquid levels and the tube diameter must be optimum to avoid the capillary action.

Reference

2022. Fluid Mechanics and Hydraulics Laboratory Manual. Higher Colleges of Technology Dubai Men`s College Civil Engineering Division.

Physical Properties of Glycerine. (n.d.). [online] Available at:
https://www.aciscience.org/docs/Physical_properties_of_glycerine_and_its_solutions.pdf.