

For Part D:

Mass (flask empty) = 17.3223 g
Mass (flask + unknown) = 25.1 g
Mass (unknown liquid) = 7.78 g
Average flask volume from Part B = 9.44 mL
Density of unknown liquid = $7.78 / 9.44 = 0.825$ g/mL
Average density of unknown liquid = 0.8986 g/mL
Absolute Deviation = $0.8986 - 0.825 = 0.0054$
Average absolute deviation = 0.00432
Relative deviation = Absolute Dev. / V (avg.) = $0.0054 / 9.44 = 0.00057$
Relative Average Deviation (RAD) = 0.000458

For Part E:

Mass (flask + 5mL) = 22.3222 g
Mass (flask + water + unknown liquid) = 26.2343g
Mass (unknown liquid) = $26.2343 - 22.3222 = 3.9121$ g
Average density of unknown liquid from part D = 0.8986 g/mL
Volume of unknown liquid = $3.9121 / 0.8986 = 4.3535$ mL
Average pipet volume (Part C) = 5.09 mL
Initial volume = $4.3535 + 5.09 = 9.43$ mL
Final volume (average V flask from B) = 9.44 mL
$\Delta V_{\text{mix}} = V_{\text{avg}} - V_{\text{flask}} = 9.44 - 9.43 = 0.01$ mL