Group work: those in the wrong group don't get any extra credit. All must sign ONE solution.

Calculate the ΔH for the following reaction:
Calorimetry:

Group Quiz #2

40.0 mls of 1.00 M $HClO_3$ is added to 40.0 mLs of 1.00 M KOH. If the temperature rises from 20°C to 25°C, what is the ΔH° for the reaction? Final answer must be expressed in terms of kJ/mole HCl reacted. (assume density of the solution is same as that of pure water, 1g/mL)
KEY:
First, write the balanced equation:

$HClO_3 + KOH \rightarrow H_2O + KClO_3$

#mol $HClO_3$ = 1.00M(40.0mL) = 40.0 mmol ; likewise # mol KOH = 1M(40mL) = 40.0 mmol

Measure the heat released:

$\Delta H = - q_{cal} = - (mC_p\Delta T)$ what mass do we use? The mass of the solution! We're measuring that with a thermometer to give us: 25-20 = 5°C, m = 40 g + 40 g = 80 g
$C_p \approx$ C_p of pure water = 4.18 J/g°C

So, ΔH = -(80.0g)(4.186J/g°C)(5°C) = -1670 J

To express as kJ/mol $HClO_3$ we need to get #mol $HClO_3$: In general, # mol = Molarity x volume(inL)
So, #mol $HClO_3$ = (1.00M)(0.0400L)=0.0400 mol $HClO_3$

Per mole $HClO_3$, we have: ΔH° = -16700 J/.0400 mol $HClO_3$ =41860 J/mol = 41.9 kJ/mol