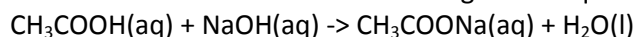


## Significant figures

1) Calculate the pressure exerted by 6.9 g of argon in a 0.07500 L container at 11.5 °C.'

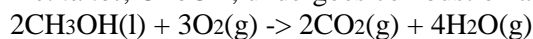
2) 20.00 mL of vinegar was titrated with a 0.11M NaOH solution.

NaOH reacts with acetic acid according to the equation below.



Three concordant titres were obtained and the average titre was 15.35 mL. Find the concentration of the vinegar solution to the right number of significant figures.

3) *Methanol*, CH<sub>3</sub>OH, undergoes combustion according to the equation



In an experiment to determine its suitability as a fuel, a sample of methanol underwent complete oxidation in a bomb calorimeter. The calorimeter was first calibrated by passing a current through an electric heater placed in the water surrounding the reaction vessel. A potential of 5.251 volts was applied for 3.00 minutes. The measured current was 1.50 amperes and the temperature of the water and reaction vessel increased by 0.593 °C.

i. Determine the amount of energy, in kJ, supplied to the bomb calorimeter.

$$\text{Energy (Joules)} = \text{Voltage} \times \text{amperes} \times \text{seconds}$$

ii. Determine the calibration constant, in kJ °C<sup>-1</sup>, for the calorimeter and its contents.

4) Four 20.00 mL aliquots of a solution of HCl of unknown concentration were titrated against a 0.4521 M NaOH, the results are shown on the table on the left.

a) Find the average titre using the three concordant results.

Trial	1	2	3	4
Final burette reading / cm <sup>3</sup>	25.11	39.12	14.15	28.20
Initial burette reading / cm <sup>3</sup>	10.10	25.11	0.15	14.15
Volume used / cm <sup>3</sup>	15.01	14.01	14.0	14.05

b) Find the concentration of the HCl solution.