Purpose:

To investigate by quantitative analysis, the variation in the concentration of Vitamin C of "Just Juice Orange and Mango" juice when heated to 20, 40, 60, and 80 degrees Celsius for 10 minutes.

① 

Calculations:

Part A – calculation of blank titration:

$V(S_2O_3^{2-}) = 0.02925$

$n(S_2O_3^{2-}) = 0.0511 \times 0.02925 = 1.494675 \times 10^{-3}$

$n(I_2 \text{ total}) = \frac{1}{2} \times 1.494675 \times 10^{-3} = 7.47335 \times 10^{-4}$

Part B – calculation of back titration:

20°C

$n(I_2) = 7.47335 \times 10^{-4}$

$n(S_2O_3^{2-}) = 0.0511 \times 0.018167 \ n(S_2O_3^{2-}) = 9.283337 \times 10^{-4}$

$n(I_2 \text{ remaining}) = \frac{1}{2} \times 9.283337 \times 10^{-4} = 4.6416685 \times 10^{-4}$

② 

$n(I_2 \text{ reacted with vit C}) = n(I_2 \text{ remaining}) = 7.47335 \times 10^{-4} - 4.6416685 \times 10^{-4} = 2.8317065 \times 10^{-4}$ mol $= n(\text{vitamin C})$

$c(\text{vitamin C}) = n/V = 2.8317065 \times 10^{-4} / 0.1 = 2.8317065 \times 10^{-3}$

Conclusion:

From the data obtained in the experiment and from the graphs of the data we can see that as the temperature is increased the average titre increases.

③