4.12   Skills and Techniques I Answers

1. Theoretical result 25.4%

Student A: Precise but NOT accurate

Student B: Both precise and accurate

Student C: Results are not precise. Two trials are not accurate, however, one trial was accurate.

2.a) The sample corresponding to a nitrite ion concentration of 0.10 mg l^{-1} seems to have given a rogue value.

b) 0.11mg l^{-1}

3. The error is that by dissolving the solute retrospectively the level of the solution will rise above the graduation mark of the volumetric flask. This will give an inaccurate concentration.

The student should dissolve the solute in a small volume of distilled water and add this with the risings to the volumetric flask. They should then carefully add more distilled water until it reaches the graduation mark.

4. 10.1-10.3 (%abv)

5. a) 2.23 % - 2.25%

b) % by mass of NaCl = 2.40%

$1cm^3$ → 1.1g

$1000cm^3$ (1 litre) → 1100g

2.4% 1100g → <u>26.4g</u>

6.a) 0.081 mol l^{-1}

b) The value of 0.079 mol l^{-1} is very close to the result obtained by the first analyst and within the margin of error. Due to this the result is reproducible.

c) For this particular synthesis it is important to have a an accurate concentration of 0.1 mol l^{-1} sodium hydroxide. Although the results from both analysts are precise they indicate that the actual concentration of sodium hydroxide is not suitable for this synthesis. Therefore the sodium hydroxide should be replaced.

7. a) The results from the melting point are both accurate and precise.

b) The Rf value was calculated to be 0.57. Due to this it is accurate.

c) The aspirin sample from the student is pure.