Section A:

1. Choose the correct words from the box below to complete the sentence.

volume	grams	solution	mass	weight	amount

Concentration is the _____ of solute in a given _____ of solution.

2. What are the correct units for concentration?

Tick one box.

dm^3 ☐

g/dm^3 ☐

dm^3/g ☐

3. A student has three test tubes, each containing 100 cm^3 of water. They add different masses of salt to each. Which of these statements is correct?

Tick one box.

All the salt solutions will have the same concentration ☐

The salt solution with the greatest mass of salt dissolved will have the highest concentration ☐

The salt solution with the smallest mass of salt dissolved will have the highest concentration ☐

4. In the box below, write the equation that links concentration, mass and volume.

5. A student has a solution which has a concentration of 0.5 g/dm^3. Which action would make the solution less concentrated?

   Tick one box.

   Adding more water ☐

   Adding more solute ☐

   Splitting the solution between two test tubes ☐

6. A person adds sugar to glass of water. Identify the solute, solvent and solution.

   Solute: _____

   Solvent: _____

   Solution: _____

Section B

7. A student has two samples of sodium hydroxide solution. One has a concentration of 24 g/dm^3 and the other has a concentration of 12 g/dm^3. Both have a volume of 200 cm^3.
   a. Identify the sample with the higher concentration.

_____

   b. Explain what it means for one sample to be more concentrated than the other.

_____

_____

_____

   c. The student adds water to make the 24 g/dm^3 solution up to a volume of 400 cm3. Compare the concentrations of the samples now.

_____

_____

_____

8. Describe and explain how the concentration of a solution could be increased.

9. Describe and explain how the concentration of a solution could be decreased.

Show all working for the following questions:

10. Calculate the concentration (in g/dm^3) of:
    a. 40 g solute in 350 dm^3

    b. 100 g solute in 77 dm^3

    c. 0.08 g solute in 20 cm^3

    d. 90g solute in 780 cm^3

11. The mass of H_2SO_4 is 32.5 g and the volume of the solution is 0.400 dm^3. Calculate the concentration of the solution formed in g/dm^3.

12. A 750 cm^3 solution of sodium chloride contains 25 g of solute. Calculate the concentration of the solution.

13. Calculate the mass of solute in:

    a. 25 cm^3 of a 2.3 g/dm^3 solution.

    b. 250 cm^3 of a 71 g/dm^3 solution

    c. 2.3 dm^3 of a 61 g/dm^3 solution

14. A solution of sodium chloride has a concentration of 400 g/dm^3. Calculate the mass of sodium chloride in 0.8 dm^3 of solution.

15. Using 83g of solute, how much water is needed to:

    a. Make a 34 g/dm^3 solution?

    b. Make a 0.1 g/dm^3 solution?

    c. Make a 83 g/dm^3 solution?

d. Make a 79 g/dm^3 solution?

_____

_____

_____

Section C

16. A person has eaten a big meal recently, and has digested many large carbohydrates to produce glucose.
    a. Calculate the relative formula mass of glucose ($C_6H_{12}O_6$).
    b. Calculate the percentage by mass of carbon in glucose.
    c. State the substrate that is broken down to form glucose.
    d. Name the enzyme that catalyses (speeds up) this reaction.
    e. In the person's small intestine, there is 30 g of glucose in a 320 cm^3 solution. Calculate the concentration of glucose in g/dm$_3$.
    f. In a sample of blood from the person's bloodstream, there is 50 μg of glucose in 25 cm^3 of blood. Calculate the concentration of glucose in this blood sample.
    g. Compare the concentration of glucose in the small intestine and the bloodstream.
    h. Describe and explain what will happen to the glucose molecules.
    i. Describe two adaptations of the small intestine that make it well suited for this function.