

Concentration Problems 2

1. How much solute is found in each solution?

- a) 15g/L <sup>15g</sup>
- b) 10g/300mL <sup>10g</sup>
- c) 15% <sup>15g</sup>
- d) 25% <sup>25g</sup>

2. You want to make 350 mL of a solution with a 15g/L concentration. How much solute will you need?

$$\frac{15g}{1000ml} : \frac{xg}{350ml} \rightarrow \boxed{5.25g}$$

3. You want to make a solution that has a concentration of 25g/600mL. If the mass of the solute is 100 g what will the volume of the new solution be?

$$\frac{25g}{600ml} : \frac{100g}{xml} \rightarrow \boxed{2400ml}$$

4. A solution has a concentration of 75g/300 mL. Calculate it's concentration in g/L.

$$\frac{75g}{300ml} : \frac{xg}{1000ml} \rightarrow 250g \rightarrow \boxed{250g/L}$$

5. You want to make a 10% (m/v) saltwater solution. How much solute is needed to make 75 mL of solution?

$$\frac{10g}{100ml} : \frac{xg}{75ml} \rightarrow \boxed{7.5g}$$

6. You want to make a 22% (g/g) sugar solution. If you use 300 g of sugar, what will the total mass of the solution be?

$$\frac{22g}{100g} : \frac{300g}{xg} \rightarrow \boxed{1363.64g}$$

7. You want to make 85 mL of a solution with a concentration of 9.5%(m/v). How much solute do you need?

$$\frac{9.5g}{100ml} : \frac{xg}{85ml} \rightarrow \boxed{8.075g}$$

8. Convert 75g/300 mL to % (m/v) concentration.

$$\frac{75g}{300ml} : \frac{xg}{100ml} \quad 25g \rightarrow \boxed{25\%}$$

9. Convert 34g/L to % (m/v) concentration.

$$\frac{34g}{1000ml} : \frac{xg}{100ml} \quad 3.4g \rightarrow \boxed{3.4\%}$$

10. Put the following concentrations in order from weakest to strongest. Show your work.

a) 7.5%

b) 33 g/L

c) 11 g/ 200 mL

$\boxed{B \rightarrow C \rightarrow A}$

$$\frac{7.5g}{100ml}$$

$$\frac{33g}{1000ml} : \frac{xg}{100ml} \\ = 3.3g$$

$$\frac{11g}{200ml} : \frac{xg}{100ml} \\ = 5.5g$$

11. What is the total mass of a solution if you use 15 g of solute to make a 45 % (g/g) solution?

$$\frac{45g}{100g} : \frac{15g}{xg} \quad \boxed{33.3\bar{3}g}$$

12. You want to make 400 mL of a 25 g/L solution. Solve and explain the process of making the solution.

① calculate mass of solute needed:

$$\frac{25g}{1000ml} : \frac{xg}{400ml} \rightarrow 10g$$

③ swirl to dissolve solute

② Mass 10g solute

③ Put solute into a 400 ml volumetric flask

⑥ add water up to 400ml mark

④ Add water half-way up flask

⑦ mix

13. You have 3 different solutions with the following volumes:

a) 25 mL,

b) 100 mL

c) 10 mL.

What mass of solute do you need for each of the solutions to have a 10 g/ 50 mL concentration?

$$a) \frac{10g}{50ml} : \frac{xg}{25g} \rightarrow \boxed{5g}$$

$$b) \frac{10g}{50ml} : \frac{xg}{100ml} \rightarrow \boxed{20g}$$

$$c) \frac{10g}{50ml} : \frac{xg}{10ml} \rightarrow \boxed{2g}$$

14. You need to prepare 250 g of a solution that has a 4% (g/g) mass concentration. What is the mass of the solute?

$$\frac{4g}{100g} : \frac{xg}{250g} \rightarrow \boxed{10g}$$

15. You want to make 3.5 L of a 15 g/L solution. How much solute do you need?

$$\frac{15g}{1000ml} : \frac{xg}{3500ml} \rightarrow \boxed{52.5g}$$

16. 50 g of a solute are used to prepare a 5L solution. What is the concentration of the solution in:

a) g/L

$$\frac{50g}{5L} : \frac{xg}{1L} \rightarrow \boxed{10g/L}$$

b) % concentration

$$\frac{50g}{5000ml} : \frac{xg}{100ml} \rightarrow \boxed{1\%}$$

17. You have 2 different types of vinegar. One is a 4% concentration the other is a 5% concentration. The 4% is cheaper than the 5% concentration. Explain if there is a difference between the two and if the 5% one is charging extra for nothing.

$$4\% = 4g / 100 ml$$

$$5\% = 5g / 100 ml$$

→ paying for 1 extra gram of solute

18. Which is more concentrated? Justify your answer.

a) 12%

b) 30 g/300 mL

c) 40 g/L

$$\frac{12g}{100ml}$$

$$\frac{30g}{300ml} : \frac{xg}{100ml}$$

$$\downarrow$$

$$10g$$

$$\downarrow$$

$$10g/100ml$$

$$\frac{40g}{1000ml} : \frac{xg}{100ml}$$

↓

$$4g$$

↓

$$4g/100ml$$

**a**