

Review for solution, electrolyte and pH test

1. Which of the following has the highest concentration?
A) 22% B) 200 g/L C) 550 ppm D) 15 mg/L

2. Convert the following units to ppm:
A) 15 % B) 150 g/L C) 24 g/300 mL D) 0.05 mg/L

3. Convert the following units to g/L:
A) 45 % B) 35 g/200 mL C) 100 g/ 3 L D) .003 mg/L

4. Convert the following units to %:
A) 300 g/L B) 50 g/250 mL C) 500 ppm D) 2.5 g/L

5. You are making yourself ice-tea, you measure 4 g of the powder and dissolve into 300 mL of water. What is the procedure used in making a g/L concentration?

6. Public pools usually contain about 7 ppm of chlorine to control bacterial growth. If your pool can hold 300 L of water how much chlorine should there be?

7. Chlorine is sometimes used in a city's water filtration system to kill micro-organisms. To ensure fish in an aquarium are not affected by the chlorine, tap water could be left sitting for 24 hours to allow the chlorine to evaporate. The lethal dose of chlorine for most goldfish is 0.004 mg/L. Most water filtration systems use 20 ppm to kill micro-organisms. Do you need to let the water sit for 24 hours so the chlorine could evaporate?

8. In a pond, the lethal concentration of nitrate (NO_3^-) is 0.04 g/L and phosphate's (PO_4^{3-}) lethal concentration is 0.3 mg/L. This means if the concentrations of nitrate or phosphate are over the values given, certain types of aquatic organisms will die.

You test the water and get the following values:

Nitrate has a concentration of 45 ppm

Phosphate has a concentration of 0.15 ppm

Determine if the pond contains any lethal doses.

9. In a pond, the lethal concentration of mercury is 0.0003 mg/L. This means if the concentration of mercury is over the value given, certain types of aquatic organisms will die. You take a sample of the water and find the mercury concentration to be 3.3 ppm, is this a lethal dose?

10. In a pond, the lethal concentration of nitrate (NO_3^-) is 0.08 g/L and phosphate's (PO_4^{3-}) lethal concentration is 0.6 mg/L. This means if the concentrations of nitrate or phosphate are over the values given, certain types of aquatic organisms will die.

You test the water and get the following values:

Nitrate has a concentration of 45 ppm Phosphate has a concentration of 0.15 ppm

Determine if the pond contains any lethal doses.

11. What is an electrolyte? Which substances are electrolytes? Why are they electrolytes?

12. How can you identify a non-electrolyte from its molecular formula?

13. Fill in the table. Give the pH range or number.

	$\text{Ca}(\text{OH})_2$	CaCl_2	CH_3COOH	CH_3OH	H_2SO_4	HCl	NCl_3	NaCl
Acid, base, salt or neither								
pH range or #								
Electrolyte or Non-elect.								

14. State whether the following pH's are acids, bases or neutral.

pH 5	pH 9	pH 7	pH 3	pH 11

15. How many times more basic is a solution oh pH 12 versus pH 9? 1 vs 6?

16. What would you add to neutralize 50 mL of a pH of 4? 60 mL pH of 11?

17. Why will salt grains not conduct electricity?

18. You have a substance and you want to find the pH of it. Explain a procedure using buffer solution, a soft plate and universal indicator that will allow you to find the pH of the substance

19. Using the table below, which indicator would you use to find a strong acid?

pH	1	2	3	4	5	6	7	8	9	10	11	12	13
A	red			Orange				Yellow					
B	Blue		green		Yellow								
C	red				purple				blue				

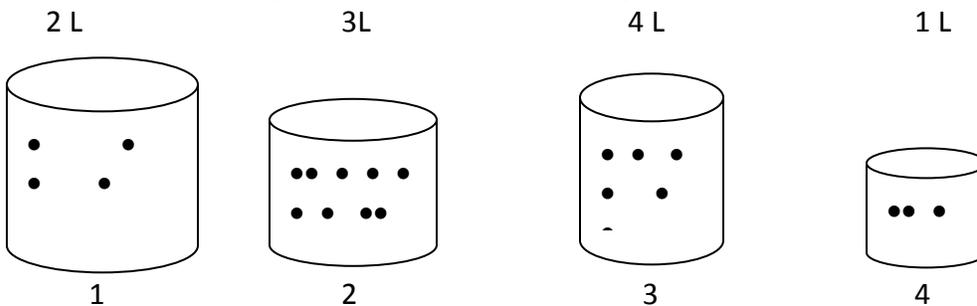
20. The concentrations of four solutions are given in the following table.

Solution	Concentration
1	20 g/L
2	0.4 g/mL
3	5 g /100 mL
4	3 g/500 mL

Which solution is the most concentrated?

- A) 1 B) 2 C) 3 D) 4

21. If the dots represent the quantity of solute used to prepare each of the following solutions, identify the solutions that have equal concentrations.



- A) 1, 2 and 4 B) 1 and 3 C) 2 and 4 D) 2 and 3

22. Choose the answer that best explains the following concentrations.

1- 10% 2- 100 g/L 3- 40 g/ 400 mL

- A) the 100 g/L solution is the most concentrated solution
- B) the 10% and the 40 g/400 mL concentrations are equal
- C) the order from weakest to strongest is 10%, 40 g/400 mL and 100 g/L
- D) they are all equal concentrations

23. Which of these substances is base?

- A) H_2SO_4 B) $\text{Ca}(\text{OH})_2$ C) NaCl D) $\text{C}_2\text{H}_5\text{OH}$

24. To check the electrical conductivity of certain liquids, a student used a conductivity apparatus equipped with a light bulb. Using the table of information, determine which substances are electrolytes.

Substances	Observations
HCl	Bright light
CH_3OH	No light
MgCl_2	Faint light
NaOH	Bright light
$\text{Ca}(\text{OH})_2$	Faint light
CCl_4	No light

- A) CH_3OH and CCl_4 C) CH_3OH , NaOH and $\text{Ca}(\text{OH})_2$
B) HCl, MgCl_2 and CCl_4 D) HCl, MgCl_2 , NaOH and $\text{Ca}(\text{OH})_2$

25. Which of the following, when dissolved in water, must be an electrolyte?

- A) CO_2 B) HNO_3 C) H_2O D) $\text{C}_6\text{H}_{12}\text{O}_6$

26. Which of the following, when dissolved in water, will be a non-electrolyte?

- A) KCl B) HCl C) KOH D) $\text{C}_2\text{H}_5\text{OH}$

27. Which of the following substances would you use to clean greasy dishes?

- A) KCl B) HCl C) KOH D) $\text{C}_2\text{H}_5\text{OH}$

28. Which of the following is a salt?

- A) KBr B) LiOH C) HNO_3 D) SO_2

29. Which of the following are characteristic properties of a basic solution?

1. Conducts electricity
 2. Does not conduct electricity
 3. Turns litmus paper blue
 4. Turns litmus paper red
 5. Does not change the colour of litmus paper
- A) 1 and 3 B) 1 and 4 C) 2 and 3 D) 2 and 5

30. You want to neutralize something with a pH of 4, what would you use?
 A) water B) An acid C) something with a pH of 7 D) $Mg(OH)_2$

31. The following table gives the colours of a universal indicator. A few drops of the indicator is added to a sample of solution. The solution turned purple. Which of the following correctly describes the solution the student was given?

pH	1	3	5	7	9	11	13
colour	red	orange	yellow	green	Turquoise	blue	Purple

- A) It is a strong basic solution C) It is a strong acidic solution
 B) It is a weak basic solution D) It is a weak acidic solution

32.

Solution	Reaction to litmus	Conducts
A	Red to blue	Yes
B	Blue to red	Yes
C	No change	Yes
D	No change	No

Which of the above solution(s) is an electrolyte?

- A) A, B and C B) A and B C) A and D D) D only

33. The lab technician stores chemicals according to their type. Classify the following substances as acids, bases or salts.

	A	B	C	D
Acids	H_2SO_4, H_2O	H_2SO_4, HCl	$KOH, Ca(OH)_2$	H_2SO_4, H_2O
Bases	$KOH, Ca(OH)_2$	$KOH, Ca(OH)_2$	$NaCl, KClO_3$	$KOH, Ca(OH)_2$
salts	$NaCl, HCl,$	$NaCl, KClO_3$	H_2SO_4, Na_2SO_4	$NaCl, KClO_3$

34. Using the table below, answer the questions below.

pH	1	2	3	4	5	6	7	8	9	10	11	12	13
A	red			Orange				Yellow					
B	Blue		green		Yellow								
C	red				purple				blue				

Which indicator would you use for a strong acid? _____

What colour will indicator A turn with a pH of 5? _____

If indicator A turns orange and indicator B turns green, what is the pH of the substance?

What is the pH range of indicator C turns purple? _____

35. Answer the questions using the pH table.

pH	2	3	4	5	6	7	8	9	10	11	12	
A	yellow		orange					red				
B	blue							purple		red		
C	blue			green			yellow					

- A) What color will the indicator B become if the pH of the unknown is 7? _____
- B) What is the pH if the indicator turns orange with A and blue with C? _____
- C) What is the pH if the indicator turns red with A and purple with B? _____
- D) Which indicator would you use to find a strong base? _____

36. In the laboratory, you are given two acid-base indicators and a colourless solution with an unknown pH.

The following table gives the colours of the two indicators at different pH values.

pH	1	2	3	4	5	6	7	8	9	10	11	12	13
Indicator 1	Yellow			Green			Blue						
Indicator 2	Violet		Yellow		Red								

When you add a drop of each indicator to the colourless solution, it turns yellow. What is the pH range of this solution?

- A) Between 1 and 4 B) Between 1 and 5 C) Between 3 and 4 D) Between 3 and 5

37. Which of the following procedures can be used to determine whether sugar is an electrolyte or a non-electrolyte?

- A) Check the electrical conductivity of a cube of sugar.
- B) Check the electrical conductivity of powdered sugar.
- C) Check the electrical conductivity of an aqueous sugar solution.
- D) Check the electrical conductivity of a heterogeneous mixture of sugar and alcohol.

38. Alice frequently uses a white cleaning powder in her home. She wants to know whether this substance is acidic, basic or neutral. In order to determine the pH of this substance, what is the first thing she must do?

- A) Put a piece of blue litmus paper on the solid.
- B) Put a piece of red litmus paper on the solid.
- C) Verify whether the solid conducts electricity.
- D) Dissolve a small amount of the solid in water.