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

22% $\frac{200}{1000} = \frac{x}{100}$ 20% $\frac{550}{1000000} = \frac{x}{100}$ .055% $\frac{.015}{100} = \frac{x}{100}$ .0015% A

2. Convert the following units to ppm:

A) 15 % B) 150 g/L C) 24 g/300 mL D) 0.05 mg/L

A $\frac{15}{100} = \frac{x}{1000000}$ 150 000ppm B $\frac{150g}{1000} = \frac{x}{1000000}$ 150 000 ppm C $\frac{24}{300} = \frac{x}{1000000}$ 80 000ppm D .05ppm

3. Convert the following units to %:

A) 300 g/L B) 50 g/250 mL C) 500 ppm D) 2.5 g/L

A $\frac{300}{1000} = \frac{x}{100}$ 30% B $\frac{50}{250} = \frac{x}{100}$ 20% C $\frac{500}{1000000} = \frac{x}{100}$ .05% D $\frac{2.5}{1000} = \frac{x}{100}$ .25%

4. 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?

$\frac{4}{300} \frac{x}{1000} = 13.3g$

① Weigh 13.3 g solute
② - Put solute in 1000mL VF
③ - add water & swirl
④ - Add water to line
⑤ - cm.

5. 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?

$\frac{7}{1000000} = \frac{x}{300000} = 2.1g$

6. 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.

$NO_3^- = \frac{.04}{1000} = \frac{x}{1000000} = 40ppm$ ∴ lethal you have 45 ppm

PO_4^{3-} = .3ppm = okay .15 less than .3 ppm

7. 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?

.0003ppm = lethal

you have 3.3 ppm = lethal

8. 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.

NO_3^- $\frac{.08}{1000} \div \frac{x}{1000\,000}$

= 80 ppm is lethal dose

∴ not dangerous you have 45 ppm

PO_4 .6 ppm = lethal dose

∴ okay you have .15 ppm

9. What is an electrolyte? Which substances are electrolytes?

Substance that conducts electricity. → acids, bases & salts

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

1st element is a non-metal

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

	$Ca(OH)_2$	$CaCl_2$	CH_3COOH	CH_3OH	H_2SO_4	HCl	NCl_3	NaCl
Acid, base, salt or neither	B	S	B	N	A	A	N	S
pH range or #	↑7	7	↑7	7	↓7	↓	7	7
Electrolyte or Non-elect.	e	e	e	Ne	e	e	Ne	e

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

pH 5	pH 9	pH 7	pH 3	pH 11
A	B	N	A	B

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

1000 → 100 000

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

50 mL pH 10 → 60 mL pH 3

15. Why will salt grains not conduct electricity?

Must be dissolved in water.

16. 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					

B

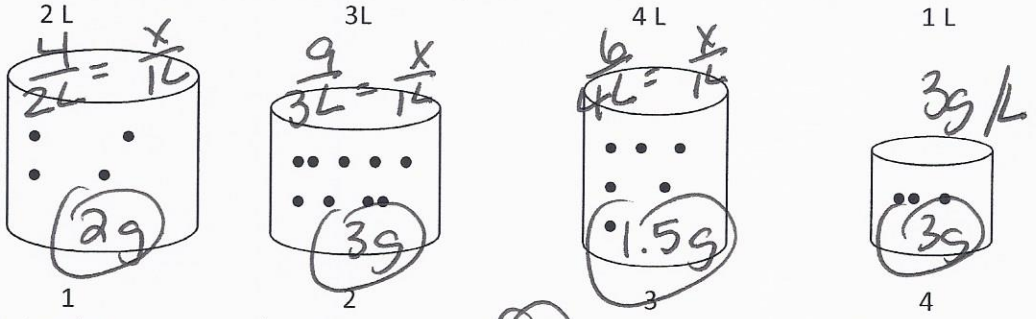
17. The concentrations of four solutions are given in the following table.

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

18. 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

19. 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

20. 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
$Ca(OH)_2$	Faint light
CCl_4	No light

A) CH_3OH and CCl_4
B) HCl, $MgCl_2$ and CCl_4
C) CH_3OH, NaOH and $Ca(OH)_2$
D) HCl, $MgCl_2$, NaOH and $Ca(OH)_2$

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

A) CO_2 B) HNO_3 C) H_2O D) $C_6H_{12}O_6$

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

A) KCl B) HCl C) KOH D) C_2H_5OH

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

A) KCl B) HCl C) KOH D) C_2H_5OH

24. Which of the following is a salt?

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

25. 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

26. 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) $Mg(OH)_2$

27. The following table gives the colours of a universal indicator. A few drops of the indictor 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	Turq-uoise	blue	Purple

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

28.

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

29. 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, $KClO_3$

30. 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.

31. In the laboratory, you are given tow 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

32. 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.

33. In the laboratory, you are given a sample of the six following substances :

HCl $Ca(OH)_2$ KCl
NaOH H_2SO_4 NaCl

You perform various experiments on these substances and observe that some of them

1. turn red litmus paper blue
2. conduct electricity

Which two substances are they?

A) HCl and H_2SO_4
B) KCl and NaCl
C) HCl and KCl
D) NaOH and $Ca(OH)_2$

34. Following a chemical spill, the contaminated soil reaches a pH value of 12. After a few days, a neutralization process begins and a second test is conducted. Its results show that the pH of the soil has become 10 times more acidic. What is the pH value after the second test?

A) pH= 1 B) pH= 7 C) pH= 9 D) pH= 11

35. You have 40 mL of a substance with a pH of 4. What will neutralize the substance?

A) 40 mL of a pH of 8
B) 40 mL of a pH of 2
C) 40 mL of a pH of 9
D) 40 mL of a pH of 10

36. Place the substances listed below in increasing order of pH.

Distilled water Soap Lemon juice Rainwater

A) Distilled water – Soap – Lemon juice – Rainwater
B) Lemon juice – Rainwater – Distilled water – Soap
C) Soap – Lemon juice – Rainwater – Distilled water
D) Lemon juice – Distilled water – Soap – Rainwater

37. Some common substances are listed below.

1. vinegar
2. distilled water
3. seawater
4. soft drinks
5. tomato juice

Which of the substances have a pH that is less than 7?

A) 1, 2, and 3 B) 1, 3, and 4 C) 1, 4, and 5 D) 2, 3, and 5

38. Scientific studies show that the number of aquatic species declines when a lake becomes more acidic. The pH of the water in four lakes was measured to determine whether aquatic species are threatened. The table below lists the pH values obtained.

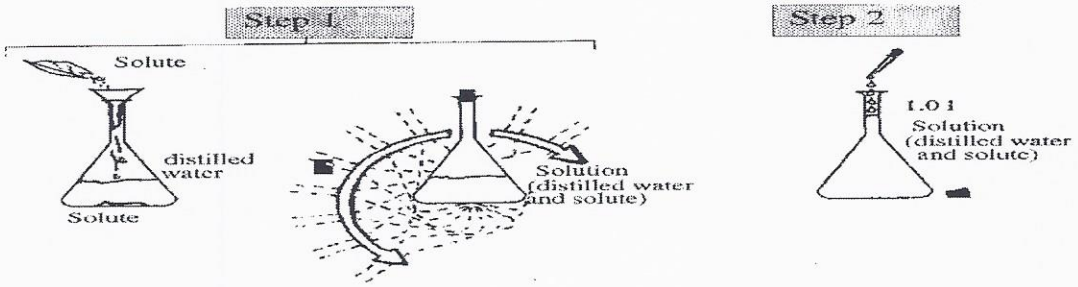
Table I - pH of the lakes examined

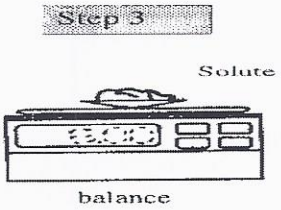
Lake	pH
1	4.2
2	6.5
3	7.0
4	7.8

Which of these lakes poses the greatest threat to aquatic species?

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

39. In what order would you carry out the steps below in order to prepare a solution of a 1.0 g/L concentration?





A) step 1, step 2, step 3
B) step 2, step 3, step 1
C) step 3, step 1, step 2
D) step 3, step 2, step 1

40. To reduce tooth decay, some cities add fluoride to their drinking water. An employee in charge of drinking water fluoridation in a big city dissolved 48 g of fluoride in 50 000 L of water. What is the fluoride concentration of the water in ppm?

$\frac{48}{50\,000\,000} = \frac{x}{1\,000\,000} = .96$ ppm

x 1000