

Review for Urinary System, Dilution and Solubility Test

1. What are the functions of the kidneys? - maintain homeostasis
- filter/purify blood of waste (urea/ure acids),
excess substances (vitamins, mineral
drugs, etc)
and water
2. What tube connects the kidney to the bladder?
ureters
3. What is the function of the bladder?
store urine
4. What tube discharges urine?
urethra
5. Which 2 pathways can the components in the kidneys take once filtered?
① nephron → ureter → bladder → urethra → out of body
② nephron → capillaries → renal vein → inferior vena cava
6. What are nephrons and what is their function?
↳ functional unit of the kidneys
→ allow for diffusion of waste + excess substances from
blood to create urine
7. What is the function of the liver?
~~help~~ - converts ammonia into urea
- helps detoxify blood
8. How does skin regulate body heat?
blood vessels dilate → increase blood flow → heat excretion
" " constrict → decrease " " → heat retention
9. What is homeostasis?
balance of all systems in the body
10. What are the main organs of the excretory system, what they excrete and how they do this?
* see quiz review sheet *
11. What type of blood does the renal artery transport? Why is it this?
unpurified + oxygenated (contains O₂)
(contains waste + excess substances)
12. What type of blood does the renal vein transport? Why is it this?
purified + deoxygenated (gas exchange, picked up CO₂)
↳ (got rid of waste + excess substances in kidney)

13. Fill in 2 substances for each box.

Must be eliminated	Must not be eliminated	Can be eliminated
- Urea - uric acid - H ₂ O	blood cells (RBC, WBC) proteins/amine acids glucose	- vitamins - minerals - drugs - salts

14. Which factors influence water absorption and urine production?

hydration, exercise, sleep, diet (salty foods), sickness (gastro)

15. Give an example where you would have high absorption of water and low urine production.

sleep eating salty foods exercise (sweating a lot)

16. Give an example where you would have low absorption of water and high urine production

drinking a lot of water eating high water foods

17. What does each variable represent when doing a dilution? Give the units used for each variable.

C ₁	initial conc. (g/L) or g/mL
C ₂	final conc. (g/L) or g/mL
V ₁	initial volume L or mL
V ₂	final volume L or mL

18. You have 800 ml of a 22% solution. You want to dilute it to a 6% solution. What is the volume of the diluted solution?

$$C_1 V_1 = C_2 V_2 \quad V_2 = 2933 \text{ mL}$$

$$22 \cdot 800 = 6 \cdot V_2$$

19. You have 800 ml of a 5 g/L solution. You need to prepare 6 L of a diluted solution. What is the concentration of the diluted solution?

$$C_1 V_1 = C_2 V_2$$

$$5 \cdot 800 = C_2 \cdot 6000$$

$$C_2 = 0.67 \text{ g/L}$$

20. You have 1500 ml of a 30% solution. You want to dilute it and have an 11% solution. Explain the procedure you would use to make the dilution.

$$C_1 V_1 = C_2 V_2$$

$$30 \cdot 1500 = 11 \cdot V_2$$

$$V_2 = 4090.9$$

$$\sim 4091 \text{ mL}$$

$$V_2 - V_1 = \text{added solvent}$$

$$4091 - 1500 = 2591 \text{ mL}$$

- ① Measure 1500ml of 30% stock solution using a graduated cylinder
- ② Pour into a large container
- ③ Measure 2591ml of water using a graduated cylinder
- ④ Pour this into the container & mix.

21. You have 500 ml of a 43 g/L solution. You want to dilute it to a 42 g/L solution.
a- What volume will you have of the diluted solution?

$$C_1 V_1 = C_2 V_2$$
$$500 \cdot 43 = 42 \cdot V_2$$
$$V_2 = 512 \text{ mL}$$

- b- Explain if the concentrated solution and the diluted solution made will have very similar shades of the solution or very different shades.

very similar since concentrations are almost the same only 12 ml of solvent was added,

22. V_2 is made up of which 2 components?

V_1 and added solvent

23. In a lab, you are told you have to dilute a solution of Kool-aid. You disagree because you think it tastes fine. When you make the dilution, which 2 variables will you manipulate and how will you manipulate them so that the dilution made is still very concentrated?

$C_2 \rightarrow$ decrease

$V_2 \rightarrow$ increase

add very little solvent

24. You want to dilute a solution considerably, but you have to follow the procedures taught in class. What 2 variables will you manipulate and how will you manipulate them so that the solution made is very diluted?

add lots of solvent

25. Define solubility.

maximum amount of solute that can dissolve in a specific solvent at a certain temperature

26. What is the difference between a saturated solution, super saturated solution and an under saturated solution?

below solubility

at solubility

above solubility (saturation point)

27. What is a precipitate?

solid deposit at the bottom of container after saturation is reached

28. Explain why you can dissolve more solute in a solvent when the solvent is heated.

faster moving particles of solvent allow for more space for solute to dissolve

29. Match the following by writing the proper number in the space provided

- | | | |
|--------------------|----------|---|
| 1. Mixtures | <u>2</u> | a single pure substance found in the Periodic Table |
| 2. Element | <u>4</u> | low concentration |
| 3. Heterogeneous | <u>7</u> | what is doing the dissolving |
| 4. Unsaturated | <u>6</u> | contain one type of particle |
| 5. Solute | _____ | made by heating a solution and cooling it slowly <i>→ Super saturated</i> |
| 6. Pure substances | <u>5</u> | what is dissolving |
| 7. Solvent | <u>3</u> | a "visible" Mixture |
| 8. Homogeneous | <u>1</u> | contains 2 or more types of particles |
| 9. Solutions | <u>9</u> | where one particle is dissolved in another |
| | <u>8</u> | solution is a type of <u>???</u> mixtures |

30. What volume of solvent would you need to make a 0.57 g/ml solution with 22g of solute?

$$\frac{0.57g}{1ml} = \frac{22g}{x}$$

$$x = 38.6ml$$

31. List the order from most concentrated to least concentrated.

- | | | | |
|------------------|-----------|----------|----------|
| ① 45 g in 89 ml | 0.51 g/ml | | |
| ② 48 g in 91 ml | 0.53 g/ml | | |
| ③ 660 g in 1.2 L | 0.55 g/ml | | |
| | <u>3</u> | <u>2</u> | <u>1</u> |
| Most | | | Least |

32. A student dissolves 48 g of sugar into 375 ml of coffee.

a) What is the solute? _____

b) What is the solvent? water

c) What is the concentration of the solution in g/L?

$$C = \frac{m}{V} = \frac{48g}{0.375L} = \frac{128g}{L}$$

33. What mass of Kool-Aid is needed to prepare 150 ml of 36 g/L drink?

$$\frac{36g}{1000mL} = \frac{x}{150mL} \quad x = 5.4g$$

34. What mass is needed to make 200 ml of a 35 % solution?

$$\frac{35g}{100mL} = \frac{x}{200mL} \quad x = 70g$$

35. A student adds 11 ml of a 70 g/L solution to a 100 ml volumetric flask and adds water to the mark on the neck. What is the concentration of the solution in the flask?

$$C_1 V_1 = C_2 V_2$$
$$70 \cdot 11 = C_2 \cdot 100$$
$$C_2 = 7.7 \text{ g/L}$$

How much water did she need to add?

$$100 - 11 = 89 \text{ mL}$$

36. Fill in the blanks:

a) In a dilution, C_1 is always > than C_2

b) In a dilution V_1 is always < than V_2

c) Common units for volume are mL or L

d) 1 L = 1000 mL