Name: _____

Physiology: Intro, Enzymes and Membrane Transport Worksheet

Directions: Write in and circle best answer on this sheet.

1. What large structure connects the two cerebral hemispheres of the brain? _____.
About _____ axons travel across and create that structure.

2. Break down the word **hyperkalemia** to show what it means: _____.

3. Give the lecture definition* for **a)** a Negative Feedback Loop and **b)** Positive Feedback Loop.
a) _____.
b) _____.

* Not the examples, but the *definitions*!

4. Name the integration center for the example given of a positive feedback loop and what it releases.

5. Name the 2 effector tissues for the specific example of a negative feedback loop in class.

6. List two important **polar molecules** and two **non-polar molecules** in our physiology class so far.

7. List the 4 properties of **Water** we need to know about.

8. Very briefly describe the 1st and 2nd Laws of Thermodynamics as they relate to Physiology.
1st =
2nd =

9. Very briefly describe anabolic and catabolic reaction in the body.
Anabolic =
Catabolic =

Questions to Consider from Enzymes:

10. All enzymes are **a)** _____ that act as biological **b)** _____.

11. Enzymes increase the **a)** _____ of a chemical reaction without being **b)** _____.

12. Suggest the best optimum pH range for **salivary amylase** to break down starch in the mouth.
a) 6 to 7 **b)** 6.2 to 6.4 **c)** 7.35 to 7.45 **d)** 7.0 to 7.35 **e)** 6.7 to 7.0

13. If an enzyme has a non-competitive inhibitor present, then:
a) the active site is blocked but the reaction will still occur
b) there is a binding away from the active site that increases the activity of the enzyme
c) the active site is blocked and the activity of the enzyme is inhibited
d) there is a binding away from the active site that inhibits the activity of the enzyme

14. What does the enzyme *alcohol dehydrogenase* do? _____.

15. What are the **3 Factors** that influence the permeability of a molecule moving across a membrane? Describe them and give specific examples for each.

1)
2)
3)

16. Give **6** important examples of **factors that influence the rate of diffusion** and how they do so**.**

1)
2)
3)
4)
5)
6)

Questions to Consider from Cell Membrane and Lab Experiments:

17. Define Filtration:

18. Define Hydrostatic Pressure:

19. Define Reabsorption:

20. Define Colloid Osmotic Pressure:

21. Which of the following statements are true for a normal healthy **plasma membrane**?

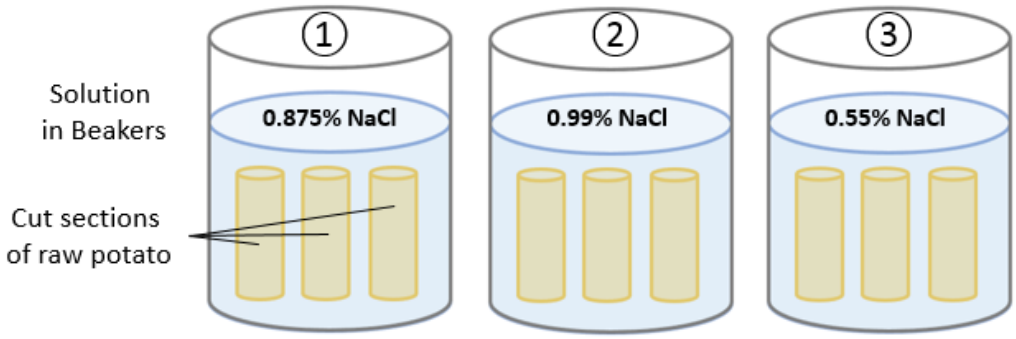
1. it's impermeable **2.** contains glycolipids **3.** contains cholesterol **4.** is identical in content all cells

a) 3 and 2 **b)** 1, 2 and 4 **c)** 1 and 2 **d)** 1, 2 and 3 **e)** 1, 2, 3 and 4

22. All of the following statements about **ion channels** are true except: (i.e., select the *false* statement)

a) they are present in plasma membranes **b)** they are formed by membrane spanning proteins
c) some channels are always open **d)** all channels respond to changes in voltage
e) some channels open and close in response to chemicals.

23. From what you know in physiology, display your understanding of what will occur in the beakers below.



a) Tonicity: ① _____ ② _____ ③ _____

b) Osmolarity: is _____ is _____ is _____

c) Potato Change*: _____ _____ _____

**Meaning predict if the Potato would: "gain water", "lose water", or "no net change in water".*

24. The cell membrane can be described as _____. What does this mean?

25. What are **3** important characteristics of a molecule that determine whether it can easily pass through a membrane?

1)

2)

3)

26. Define **passive** transport:

27. List **3** types of passive transport and an example of what gets transported in each type.

1)

2)

3)

28. Describe how **6** different factors can influence the *rate of diffusion* of a molecule.

1)

2)

3)

4)

5)

6)

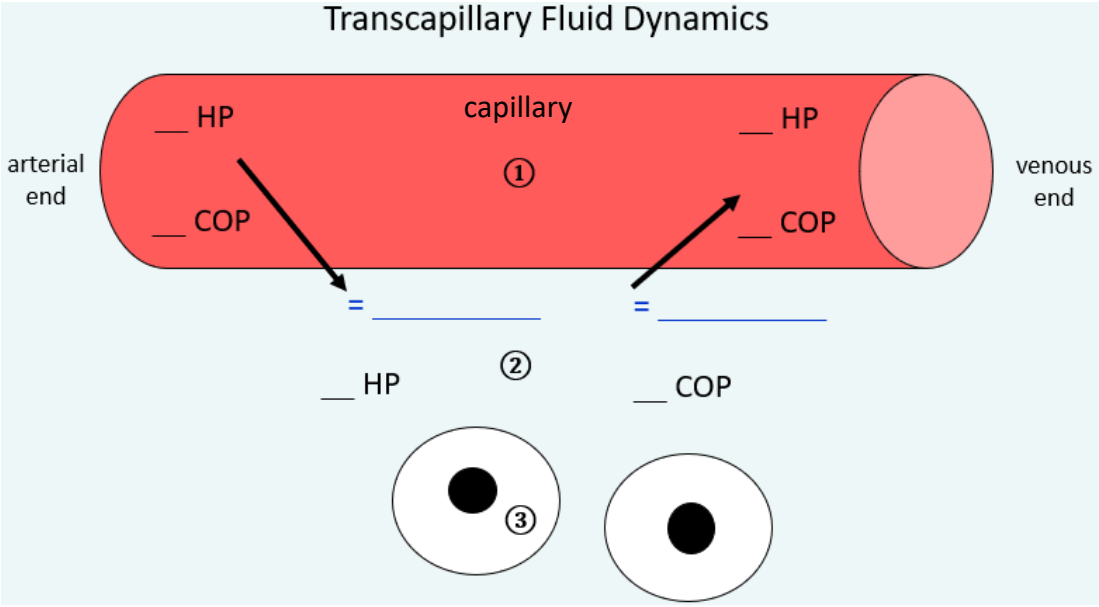
29. Define **active** transport:

30. Draw a detailed diagram of the **Na^+/K^+ pump** (Na^+/K^+ ATPase). List all of the things that it is.

31. Draw a detailed diagram of the **Na^+/glucose** symport plasma membrane transport system.

32. Use the space below to define **Hydrostatic Pressure** (HP) and **Colloid Osmotic Pressure** (COP). Briefly describe how HP and COP act across the walls of a capillary to balance ***Transcapillary Fluid Dynamics***.

33. Fill in the diagram below, include the relative levels of HP and COP shown, name the **3** tissue fluid compartments (①, ②. ③), and concentrations of K^+, Na^+, Cl^-, Ca^{2+} and Pro^-s in each fluid compartment.



34. Osmosis is a special case of _____ for water.
a) filtration **b)** active transport **c)** carrier transport **d)** diffusion **e)** facilitated diffusion

35. Protein carriers resemble enzymes, except for the fact that protein carriers
a) are not proteins **b)** do not have binding sites **c)** change conformation when they bind a ligand
d) are not specific for the ligands they bind **e)** do not chemically change their ligands

36. Which of the following statements about the resting membrane potential is <u>true</u>?
a) it is usually equal to zero mV **b)** it is created and maintained, in part, by the Na^+/K^+ pump
c) it is created, in part, by extracellular proteins **d)** the inside of the cell is positive compared to the outside

37. Compare the solutions 1.0 M NaCl and 1.0 M Glucose: Which of the following statements are **true**?
1. their molarity is the same **2.** the NaCl has twice the osmotic pressure **3.** their osmolarity is the same
4. NaCl ionizes in solution to give two particles **5.** glucose can give 6 carbons in solution
a) 1, 4 and 2 **b)** 1 and 5 **c)** 4, 3, 1 and 5 **d)** 1 and 2 **e)** 1 only

38. There are 4 molecules racing to get across a typical cell membrane. <u>Contestants</u>: **$C_6H_{12}O_6$**, **CO_2**, **Cl^-** and **$CH_3CH_2CH_2COOH$** (a fatty acid). *On a separate piece of paper*, describe the obstacles they'd encounter and the mechanisms they'd need to use to get across. Also, predict the order they'd make it across.