**Final Exam Review #2 KEY**

**Questions Part A**

1. **D – Phospholipid Bilayer**
2. **A- Cells placed in distilled water are being placed into a completely HYPOTONIC environment, so the cell cytoplasm is relatively Hypertonic. The cell will swell and most likely lyse.**
3. **D – Spherical is very aerodynamic, think of a rain drop. Cells that want to increase their SA: Volume Ratio will want to flatten themselves out or fold over their membrane, much like microvilli.**
4. **D – Substances like to move from high concentrations to a low concentration during diffusion.**
5. **A – "Solutes suck"**
6. **C – Turgor pressure has occurred.**
7. **C – Both types of endocytosis require ATP**
8. **A - 0.5% is less concentrated than 0.9%**
9. **C – Active Transport is required**
10. **D – They are hydrophobic so are the fatty acid chains of the phospholipid bilayer.**

**Short Answer – Part A**

1. **You should know the roles of Proteins (think C.R.E.R.C.), Phospholipids (act as barrier to form boundary around cell) and Cholesterol (firms up the consistency of the membrane)
See Picture Below:**



1. **Semi-permeable usually means that any small things can pass through while large things are kept out. The cell membrane can dictate what comes and goes (somewhat) regardless of its size.**
2. **Diffusion rates are affected by:**
3. **Concentration gradient- The stronger the gradient the faster the rate.**
4. **Temperature – The more kinetic energy in the particles the faster the rate of diffusion will be.**
5. **Surface Area – The more surface area that a material can move across, the faster the rate.**
6. **Size of Particle – The smaller the particle the faster the rate.**
7. **Phase of Matter – Diffusion takes place fastest in gases, then liquids and slowest by far in solids.**
8. **See diagrams below:**



1. **Active Carrier Transport uses a Protein Carrier to move a substance against a concentration gradient. This requires ATP. A good example of this is Sodium/Potassium Pumps.**

**Facilitated Transport must also use a protein carrier, but no ATP is required as the movement is with the concentration gradient.**

1. **See Table Below: ACTIVE TRANSPORT requires ATP**

|  |  |
| --- | --- |
| **TYPE OF MOVEMENT** |  **TYPE OF TRANSPORT** |
| **DIFFUSION** | **PASSIVE** |
| **OSMOSIS** | **PASSIVE** |
| **FACILITATED TRANSPORT** | **PASSIVE** |
| **CARRIER TRANSPORT** | **ACTIVE** |
| **ENDOCYTOSIS – Pinocytosis** | **ACTIVE** |
| **ENDOCYTOSIS – Pagocytosis** | **ACTIVE** |
| **EXOCYTOSIS -**  | **ACTIVE** |

**17.A) Side "A" will see a rise in its volume as water moves over to side A from Side B. This will cause the concentration on side A to go down so it will be less than 10%. Side B will see a drop in its level.**

**B) Again "Solutes Suck"!. The water will move into the starch, so the level of starch solution will go up the tube. The water level in the dish will go down.**

**C) The 10% starch solution will suck water over to side B. This will cause the level of fluid on side B to go up (while concentration drops below 10%). Meanwhile, the fluid level on Side A will drop (while concentration will go above 5%).**

**18. The point at which the mass change equals "0" represents the concentration that was Isotonic to the tissue. According to this graph, the solution that was 1.0% NaCl is isotonic to the tissue.**

**Questions Part B**

1. **C – The product of each enzyme becomes the substrate for the next enzyme. In this example B is the product of Enzyme 1, but it is then the substrate for Enzyme 2.**

 **E1 E2 E3**

**Ex. A 🡪 B 🡪 C 🡪 D**

1. **B**
2. **D**
3. **C – Coenzymes are organic components of a holoenzyme.**
4. **D – They lower the energy of Activation.**
5. **C – All the others will cause a change in the shape of an enzyme.**
6. **C – Less substrate will get consumed by the enzyme, as competitive inhibitors are likely to be occupying the enzymes active site.**
7. **C – The first step is that the substrate binds with the enzyme, water will bind as well. Then the water gets used up during the hydrolysis.**
8. **(E = Enzyme, S = Substrate, P = Product)**

**A – Ensymes are mostly protein and proteins are made out of amino acids.**

1. **C – looks about perfect.**

**SHORT ANSWER – Part B**

1. **When enzymes are not in their optimal conditions the enzyme's productivity (turnover number) goes down.**
2. **See graph below.**



**As one adds more kinetic energy to the molecules, the molecules have a better chance of hitting the active site. But as more and more heat is added the enzyme becomes denatured as many of the proteins H-bonds quickly break apart.**

1. **It is very important for an enzyme to keep the proper 3-dimensional shape to help it create the near perfect, specific active site shape.**



1. **See below – Less open active sites for specific substrate.**



1. **Cells can conserve more energy and run reactions more efficiently by using enzymes to lower the activation energy required to run vital metabolic reactions.**
2. **You should know both Models of enzyme substrate complex.**

