BIOL-8 Practice Test 02

Modules 5-6: Membranes & Metabolism

Instructions: This practice test covers material from Modules 5 and 6. Answer all questions to the best of your ability.

Part A: Multiple Choice

Module 5: Membranes

1. The plasma membrane is described as a "fluid mosaic" because: A) It is made entirely of phospholipids B) Proteins float and move within a flexible lipid bilayer C) It is rigid and tightly packed D) Water flows freely through it

2. The hydrophobic tails of phospholipids face: A) Toward the extracellular fluid B) Toward the cytoplasm C) Toward each other, inside the bilayer D) Toward the membrane proteins

3. Cholesterol in the plasma membrane functions to: A) Transport oxygen across the membrane B) Maintain membrane fluidity across temperature changes C) Act as a receptor for hormones D) Provide energy for active transport

4. Which type of membrane protein spans the entire lipid bilayer? A) Peripheral protein B) Integral (transmembrane) protein C) Glycoprotein D) Glycolipid

5. A red blood cell placed in a hypotonic solution (like pure water) will: A) Shrink (crenate) B) Remain unchanged C) Swell and possibly burst (lyse) D) Divide

6. Simple diffusion moves molecules: A) Against their concentration gradient using ATP B) Down their concentration gradient without energy C) Through channel proteins only D) By vesicle transport

7. The sodium-potassium pump is an example of: A) Passive transport B) Simple diffusion C) Active transport D) Osmosis

8. Phagocytosis is a type of endocytosis that involves: A) "Cell drinking" of fluids B) "Cell eating" of large particles C) Releasing signals to other cells D) Moving water across the membrane

Module 6: Metabolism

9. Metabolism is best defined as: A) The breakdown of food in the stomach B) The sum of all chemical reactions in an organism C) The production of ATP only D) The release of heat from the body

10. A chemical reaction that releases energy (like breaking down glucose) is called: A) Endergonic B) Exergonic C) Anabolic D) Photosynthetic

11. Enzymes speed up chemical reactions by: A) Raising the temperature of the cell B) Lowering the activation energy required C) Adding energy to the reaction D) Changing the end products

12. The region on an enzyme where the substrate binds is called the: A) Allosteric site B) Active site C) Catalyst site D) Product site

13. The First Law of Thermodynamics states that: A) Energy cannot be created or destroyed, only transformed B) Entropy always increases C) Energy transfer is 100% efficient D) Heat is the most useful form of energy

14. Which molecule is considered the "energy currency" of the cell? A) Glucose B) DNA C) ATP D) Starch

15. The overall goal of cellular respiration is to: A) Make glucose from CO_2 B) Convert the energy in food into ATP C) Create oxygen for the cell D) Produce body heat

16. Which stage of cellular respiration occurs in the cytoplasm and requires no oxygen? A) Citric Acid Cycle B) Electron Transport Chain C) Glycolysis D) Oxidative Phosphorylation

17. During the Citric Acid (Krebs) Cycle, which gas is produced as a waste product? A) Oxygen B) Carbon Dioxide C) Nitrogen D) Hydrogen

18. The electron transport chain uses the energy of electrons to pump __ across the inner mitochondrial membrane. A) Water B) Hydrogen ions (protons) C) ATP D) Oxygen

19. What is the final electron acceptor in aerobic respiration? A) Carbon dioxide B) Water C) Oxygen D) NAD+

20. In the absence of oxygen, human muscle cells perform __ fermentation. A) Alcoholic B) Lactic acid C) Acetic acid D) Citric acid

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Part B: Fill in the Blank

21. The movement of water across a selectively permeable membrane is called ___.

22. A solution with a higher concentration of solutes than the cell is ___.

23. ___ transport requires ATP to move substances against their gradient.

24. Reactions that build larger molecules from smaller ones are called ___ reactions.

25. When an enzyme loses its shape due to high heat or wrong pH, it is said to be ___.

26. The organelles responsible for most ATP production are the ___.

27. Glycolysis splits one molecule of glucose into two molecules of ___.

28. Fermentation regenerates ___ so that glycolysis can continue without oxygen.

Part C: Short Answer

29. Compare Passive Transport and Active Transport. Give an example of each.

30. Explain how enzymes work using the "lock and key" or "induced fit" analogy.

31. Trace the flow of energy in cellular respiration. Where does the energy start (what molecule), and what is the final usable form?

32. Why do your muscles burn during intense exercise? Explain the metabolic pathway involved.

End of Practice Test 02