

1. The transfer of ADP and ATP across the mitochondrial membrane involves a transfer of one ADP in for each ATP that comes out. This type of phenomenon is called _____ . (2%)
2. In germinating plant seeds fatty acids may be oxidized such that the carboxyl carbon is lost as CO₂ and requires H₂O₂; this system is called _____ . (2%)
3. If lactose is exhaustively methylated and then hydrolyzed by mild hot acid, what would be the expected products? (2%)
4. Why is lysozyme an effective "killer" of bacteria? (2%)
5. Cellular oxidation or respiration is central to the field of biochemistry and refers to: _____ . (2%)
6. Coenzymes play what general role in enzymology? (4%)
7.
$$E + S \xrightleftharpoons[k_2]{k_1} ES \xrightleftharpoons[k_4]{k_3} E + P$$

K_m approximates the value of K_s when what condition is met? (4%)
8. What does a noncompetitive inhibitor differ from a competitive inhibitor? (4%)
9. What are the α-helix and β-pleated sheet structures both characterized by? (4%)
10. Why are reliable enzyme assays performed under zero order conditions with regard to substrate? (4%)
11. How do plant starch and animal glycogen differ? (4%)
12. What is the main purpose of the pentose phosphate pathway? (4%)
13. Riboflavin in a nucleotide form is involved in one reaction of the TCA cycle. What is the enzyme that catalyzes that reaction? (4%)
14. Sodium phosphate or inorganic phosphate is picked up by the substrate in one reaction of glycolysis and one reaction of the TCA cycle. Give the two enzymes that catalyze those reactions. (4%)

15. Explain why fatty acids are one of the most efficient storage forms of energy. (4%)
16. Explain why a protein is frequently least soluble at its isoelectric pH. (4%)
17. What are Okazaki fragments? (5%)
18. What is the basic difference between a transaminase reaction and the glutamine synthetase reaction? (5%)
19. Explain why valine fed to *E. coli* starves the organism for isoleucine. (10%)
20. Define the following terms: (6%)
 - (a) signal sequences.
 - (b) ionophore.
21. List three properties that one would expect a repressor molecule to have. (10%)
22. RNA hairpin followed by several U residues causes the termination of transcription. How does this hairpin-oligo-U structure terminate transcription? (10%)