Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (2 points) Which of the following should help to speed up the decomposition of the hydrogen peroxide reaction? (There may be more than one answer, circle all that apply)
   1. Enolase enzyme
   2. RNAse enzyme
   3. Catalase enzyme
   4. Heat
2. Diagram

   Description automatically generated(3 points) Circle the letter of the graph that best represents the metabolic response of an endothermic animal (like a mouse) to changes in ambient temperature? Note that “ambient temperature” refers to the environmental temperature experienced by the animal.
3. (5 points) Which of the following statements does NOT help explain a COLD-blooded (ectothermic) animal’s metabolic response to ambient temperature? Circle one.
   1. Maintaining a constant body temperature requires more energy expenditure when ambient temperatures are low
   2. Ectotherm body temperatures tend to match ambient (environmental) temperatures
   3. An animal’s metabolic rate is determined by the combined rates of many chemical reactions
   4. More heat energy increases the rates of chemical reactions
   5. Higher temperatures mean that molecules have a greater amount of heat energy (i.e., kinetic energy)
4. (3 points) Glucose metabolism (as measured in the yeast metabolism lab) and H2O2 (hydrogen peroxide) decomposition are examples of:
   1. Catabolism
   2. Anabolism
   3. Catabolism and anabolism, respectively
   4. Anabolism and catabolism, respectively
5. (3 points) If you hold two frogs with different masses at the exact same body temperature, which do you predict will have a faster breathing rate?
   1. Neither; they will have the same breathing rate
   2. The bigger (heavier) frog
   3. The smaller (lighter) frog
6. (4 points) Which of the following is NOT a true statement about enzyme catalysts? Choose one.
   1. Enzymes bind to chemical reactant(s) and stabilize the transition state for the reaction, making it easier for a reaction to occur
   2. Your body needs to constantly make new enzymes to replace old enzymes that were used up by chemical reactions
   3. Enzymes reduce the activation energy of a chemical reaction, i.e., the amount of kinetic energy needed for a reaction to occur
   4. Enzyme catalysts are necessary for metabolic reactions like H2O2 decomposition, which have high activation energies that prevent them from occurring spontaneously at normal body temperatures
   5. Enzymes are protein molecules that may be thousands of times larger than the chemical reactants they bind to
7. (5 points) This graph shows the effect of body temperature on log-transformed metabolic rates for a several major groups of organisms, including endotherms (i.e., mammals & birds), fish, amphibians, reptiles, invertebrates, single-celled protozoans, and plants. Rather than showing raw body temperatures, the x-axis is the inverse of temperature in degrees Kelvin times Boltzmann’s constant (i.e., 1/(kT)). There is a straight line fitted to the data for each taxonomic group. All seven lines have nearly identical slopes of negative 0.69.

Which of the following statements is NOT a reasonable interpretation of the information in this graph? Circle one.

* 1. Diagram

     Description automatically generatedAll seven lines have similar slopes, suggesting that all these taxonomic groups have similar metabolic responses to temperature
  2. At any given body temperature, endothermic animals tend to have higher metabolic rates than ectothermic animals
  3. All seven taxonomic groups tend to have lower metabolic rates when their body temperatures are higher
  4. The slope of each line represents the metabolic activation energy for each group of organisms