

Concepts of Science Exam 2 NAME _____

February 16, 1999

Seat No. _____

When Solving Problems, be sure to show all work

1. Briefly define the following terms. (35%)

a. Exothermic Reaction

b. Carbohydrate

c. DNA Fingerprinting

d. Kinetic Energy

e. First law of thermodynamics

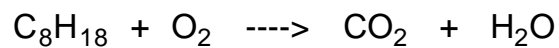
f. Retrovirus

g. Enzyme

2. Briefly describe the general structure of the DNA molecule (including shape, number of "strands", and orientation of N-base pairs. The use of simple diagrams is highly desirable in answering this question). Name the scientists who first described this model. (10%)

3. Briefly describe how DNA makes an RNA copy of itself (The use of simple diagrams is highly desirable in answering this question). (10%)

4. Octane (C_8H_{18}) burns in air as shown below.



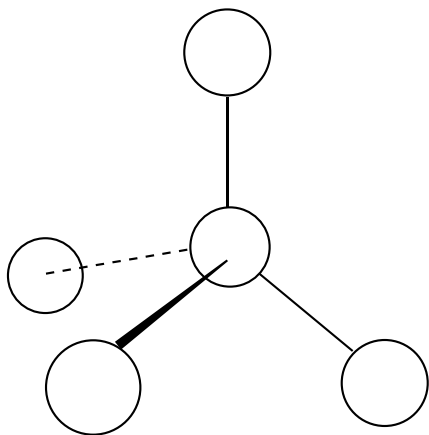
a. Balance this equation (6%).

b. How many grams of carbon dioxide (CO_2) will be produced when 50 g of octane is burned in air? (6%).

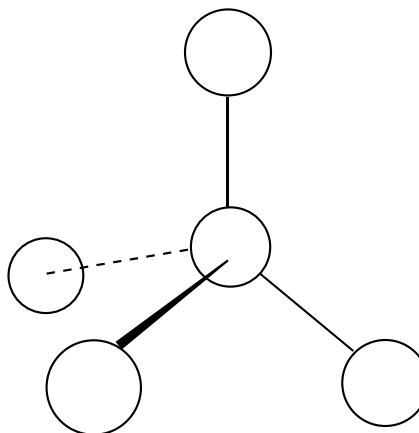
c. The heat of combustion of octane is 1302.7 kcal/mol. How much energy (in kcal) is produced when the above 50 g of octane is burned? (6%).

5a. Complete the following sentence: "An object is chiral if" (5%)

b. In the molecules below, put symbols for 4 colors (Y=yellow, G=green, R=red, and B=blue) in the balls so that the molecule on the left is chiral and the one on the right is not chiral. (10%)



Chiral



Not Chiral

6. a. Calculate the potential energy of a 0.2 kg egg we carry to the top of Haley center 50 meters above the ground? (6%)

b. Calculate how fast this egg is going when we drop it onto the head of a 2 meter tall unsuspecting professor on the concourse. (6%)