CHEM-342 Introduction to Biochemistry
Mid-term Examination - Group Part
Friday, 25 March 2011
H. B. White - Instructor
35 Points

Group Members _____

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Average 31.4 Range 29-34/35

Important - Please read this before you turn the page.

1. Write your names or group number on each page of the exam you turn in.
2. This part of the examination is closed book and closed notes.
3. If you do not agree with your group, you may submit the examination under your own name for separate grading.

This group examination is in some sense about life and death. It was inspired by the people of Japan who are suffering the consequences of a horrific earthquake, destructive tsunami, and subsequent nuclear catastrophe.

CHEM-342 uses hemoglobin as a vehicle for learning about biochemistry concepts, relating them to other disciplines, developing problem-solving skills, and working productively in groups. Ideally such knowledge and skills should be transferable to virtually any subject. Thus, this group examination is based on a topic unrelated to hemoglobin, but the skills required to do well are ones emphasized in this course. Furthermore, the topic selected is of considerable current interest and potentially, though hopefully not, useful to you someday.

1. (25 Points) Generate a concept map with a suitable title that uses the information in the following paragraphs.

   In the environment, the element iodine occurs naturally as ^{127}I, a non-radioactive (stable) isotope. Humans require iodine as a micronutrient. It accumulates in the thyroid gland where it is incorporated into thyroxine, a thyroid hormone that activates transcription of particular genes and stimulates metabolic rate. Goiters, greatly enlarged thyroid glands that were formerly observed among people living in iodine-deficient areas of the United States, have been virtually eliminated by adding small amounts of potassium iodide to table salt (iodized salt).

   Significant increases in childhood thyroid cancer occurred following the 1986 Chernobyl accident due to the ingestion and inhalation of ^{131}I, a short-lived ($t_{½} \approx 8$ days) radioisotope of iodine derived from the fission of uranium in nuclear power plants and nuclear bombs. In order to reduce the chances of getting thyroid cancer, people exposed to radioactive fallout downwind from the nuclear reactors damaged by the recent Japanese earthquake and tsunami, have been given potassium iodide tablets to take daily during exposure.

Space for your concept map.

2. (10 Points) Generate 10 substantive, well-articulated learning issues relating to the paragraphs.