

CHEM-342 Introduction to Biochemistry
Midterm Examination - Individual Part (75%)
Wednesday, 25 March 2009
H. B. White – Instructor

Name _____

Average = 66.0 ± 17.0, Range = 35-93/105 N=21

Important - Please read this before you turn the page.

There are 10 pages to this examination including this page.

Write your name on every page.

This individual part of the midterm examination is worth 105 points.

Answer questions 1-5. Then answer any four of the remaining questions 6 - 11.

The examination is closed book until 8:15 AM. Thereafter you may refer to your notes, course reader, handouts, or graded homework assignments. Textbooks and reference books cannot be used.

This examination will assess your learning, problem-solving skills, and ability to communicate clearly. It is intended to be challenging even to the best students in the class.

Writing reflects how you think. Better quality answers will receive higher marks. Therefore organize your thoughts before you write and draw. Among the “right answers” I will read, some will be better than others because they:

- show greater depth of understanding,
- provide a more logical structure,
- use appropriate examples,
- include appropriate illustrations,
- avoid extraneous or inaccurate information, and
- choose words with precision.

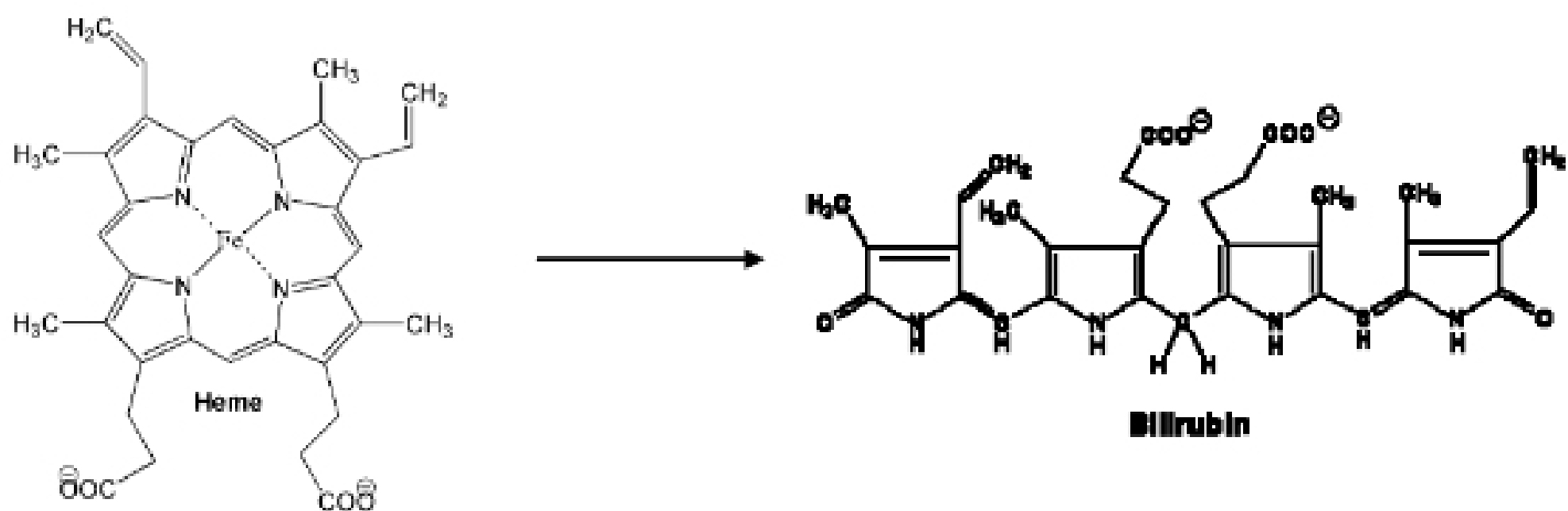
Strive to write not that you may be understood, but rather that you cannot possibly be misunderstood. Stream of consciousness answers are rarely well organized or clearly presented. Also, **USE YOUR OWN WORDS**, transcription of words from your notes does not show me that you understand.



I don't have all of the answers, but I'm beginning to ask the right questions."

Answer Questions 1 – 5 and then four of the remaining questions 6-11.

1. (3 Points) What is the normal human body temperature in degrees Celsius? Show your work if you make a calculation.
2. (3 Points) Estimate the partial pressure of oxygen in this room? (Provide units with your number)
3. (9 Points) Herrick's patient had jaundice, a condition caused by the accumulation of bilirubin, a breakdown product of heme. The structures of bilirubin and heme are shown below. Circle all of the atoms in heme that are lost and all of the atoms in bilirubin that are gained in this metabolic transformation.



4. (15 Points) Zinoffsky was not the first to purify horse hemoglobin and determine its iron and sulfur content. In fact, Zinoffsky presents a table early in his paper that lists the results of three other researchers whose values seem pretty consistent but different from the values Zinoffsky himself reports. (See table below.) Assuming the earlier results were correct, *estimate* the corresponding empirical weight for horse hemoglobin. Show your work.

| Author | Percent Sulfur | Percent Iron | Mean Value Sulfur/Iron | Calculated Emp. Wt. |
|---------------|----------------|--------------|------------------------|---------------------|
| Bucheler | 0.6532 | 0.4670 | - | |
| " | 0.6443 | 0.47238 | 2.427 | |
| " | - | 0.46720 | - | |
| Kossel | 0.65 | 0.47 | 2.42 | |
| Otto | 0.67 | 0.45 | 2.60 | |
| Ave of above | 0.654 | 0.465 | 2.48 | ? |
| Zinoffsky Ave | 0.391 | 0.334 | 2.03 | 16,800 Da |