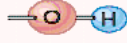


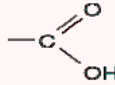
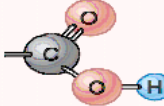


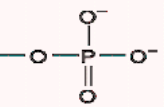
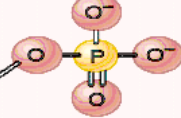
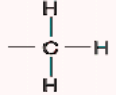
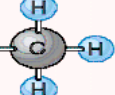


Final Exam
BI-102, Winter '03-'04, Dr. C. S. Tritt

This is a 2 hour, closed book, closed notes exam. Each answer is worth 2.5 points. Use the amount of space provide as a guide as to how detailed to make your answers. Most of these questions can be answered with a few words or a short sentence. Please try to keep your answer short and concise. Pay special attention to the words *and* and *or* in the questions and structure your answers accordingly.

1. Identify and label each of the following functional groups in the table below
a) amino, b) carboxyl, c) carbonyl (keto & aldo), d) hydroxyl, e) methyl and f) phosphate.

Group	Structural Formula	Ball-and-Stick Model	Found In:
	—OH		Carbohydrates, alcohols
			Formaldehyde
			Amino acids, vinegar
			Ammonia
			Phospholipids, nucleic acids, ATP
			Methane gas

- Describe a key difference between prokaryotic and eukaryotic cells.
- Describe the general function of *mitochondria* in eukaryotic cells.
- Name **or** describe an import plasma membrane protein function.
- Sketch **or** describe the general chemical structure of cell membrane phospholipids.
- Describe what you would expect to happen to a cell placed in a hypertonic solution.
- Explain the difference between *hormones* and *paracrine secretions*.

8. Name **or** describe an important second messenger **and** explain why second messengers are important.
9. Name or describe the important function *enzyme cascades* perform in cells.
10. With respect to metabolism, define oxidation **and** reduction.
11. Describe **or** sketch how temperature typically affects enzyme activity (i.e. chemical reaction rate).
12. Describe the most important role of ATP in cells.
13. Where does glycolysis occur in cells (i.e. is it in the cytosol or the mitochondria)?
14. Where does the Krebs cycle occur in cells (i.e. is it in the cytosol or the mitochondria)?
15. Name the *terminal electron acceptor* for aerobic metabolism (i.e. what molecules ultimately accept the electrons passed along the *electron transport chain*?).
16. Describe the critical or key difference between *diploid* and *haploid* cells (you may use the symbol N in your answer).
17. Describe **several** (2 or 3) key differences between the processes of *mitosis* and *meiosis*.
18. With regard to the cell cycle, what is a *checkpoint*?
19. Explain the importance of *synapsis* and *crossing over* during meiosis.
20. In a few words, what are *gametes*?
21. In a few words, what is a *zygote*?
22. Where would you expect to find *Barr Bodies*?
 - a. In male somatic cells.
 - b. In female somatic cells.
 - c. In sperm.
 - d. In oocytes.
 - e. In a speakeasy in late 1920's Chicago.
23. A man with type A blood and a woman with type B blood has a child with type O blood. What does this tell you about their (the man's and woman's) genotypes?

24. What would you suspect about the characteristic (gene) of interest if reciprocal crosses produce different results with respect to the F₁ and F₂ phenotype ratios?
25. What are *linked genes* **and** why they don't assort independently?
26. With respect to genes and DNA, explain the difference between *transcription* and *translation*.
27. With respect to the genetic code, what is a *codon*?
28. With respect to cell biology, what is a *promoter*.
- An RNA sequence that encourages translation.
 - A DNA sequence that encourages transcription.
 - An amino acid sequence that encourages chemical reaction.
 - An enzyme that encourages phosphorylation.
 - A seedy guy that arranges boxing matches.
29. Name **or** describe a type of post-transcriptional mRNA modification.
30. From a molecular prospective, explain how can cells with essentially identical DNA be quite different from one another in form and function (be specific).
31. With respect to gene expression, describe the function of *repressors* **or** *activators*.
32. Define the term *carcinogen*.
33. Explain how a virus can cause cancer (be specific).
34. Contrast the nature or effects of *proto-oncogenes* and *tumor suppressor genes*.