

BIOL 213
Fourth Exam

All atoms, chemical bonding and structures must be complete and correct for full credit. Please print and sign your name on the back page.

1. Describe the difference between the roles of chlorophylls in the light harvesting complex (LHC) and the chlorophylls in the reaction centers (RC).

(2 pt) a. LHC

(2 pt) b. RC

- (6 pt) 2. A mutation in the gene for ferredoxin occurs such that ferredoxin cannot pass its electrons to FAD yet is functional otherwise. The photosynthetic organism is still able to continue growth. Explain.

(10 pt) 3. Draw the correct and complete chemical structures and complementary base pairing for the following template DNA deoxynucleotides and primer RNA nucleotides as it exists to initiate DNA synthesis on the template strand.

3' - GT.....5' (template DNA)
5' - CU.....3' (primer)

(4 pt) 4. Describe the origin of replication for *E. coli* DNA replication. What is the role of the initiator protein complex?

(10 pt) 5. Describe the process of eucaryotic replication for a linear double strand DNA. Identify all enzymes and factors required.

(2 pt) 6. There are three (3) primary DNA polymerases in prokaryotic cells: Pol I, Pol II, and Pol III. Pol III is the primary replication enzyme. What are the general roles of DNA Pol I and II?

7. Consider the consequences for the following mutation:

(2 pt) a. Predict the possible results if this mutation occurred within the nucleotide sequence of the promoter of a gene.

(2 pt) b. Predict the possible results if this mutation occurred within the open reading frame nucleotide sequence of the gene.

(5 pt) 8.	Type or name of polymerase
Transcription of eucaryotic mRNA genes	_____
Transcription of eucaryotic tRNA genes	_____
Transcription of eucaryotic rRNA genes	_____
DNA synthesis from RNA template	_____
RNA synthesis from RNA template	_____

(4 pt) 9. Describe the essential details and the factors involved in just the initiation of transcription.

(5 pt) 10. In procaryotes the processing of a messenger RNA for translation is not as complex as that required for a eucaryote mRNA. Describe the details for eucaryote processing of primary transcripts for mRNA.

(10 pt) 11. Describe the molecular details of Group III intron splicing to the point of the joining of two exon sequences.

(5 pt) 12. Name five (5) activities of non-histone acidic proteins in the nucleus

(4 pt) 13. The histone protein that is responsible for the highly condensed packaging of nucleosomes is: _____ . Describe the general nature of the sequences and domain structure of a histone.

(3 pt) 14. If the anticodon is C A I what are the codons to which this anticodon can bind? You may use the reference tables provided at the end of the test.

(2 pt) 15. How does the eucaryotic translation initiation complex recognize the correct translation initiation codon to initiate translation?

(10 pt) 16. Describe (cartoon) and label the arrangement of sequence elements in genes coding for eucaryotic mRNA's.

(12 pt) 17. Describe (cartoon) the molecular details for the initiation of translation. Label and identify all factors involved.