BCH 4054 **PRE-TEST 5** **GROUP NAME _____**
November 30, 1999

This test is take-home and open book, and it is intended that all members of the group contribute to completing it. Only one copy is to be submitted by the group, and all members who participated should sign their names below. **Test is due by 9:00 am Tuesday, December 7.**

Please use dark pencil or ink and write legibly.

_____ _____

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Page	Points
1	_____
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Points

(8) 1. From the following DNA sequences, write the complementary sequence under it (in the 3' to 5' direction), and circle the bases of the resulting double stranded DNA which are palindromic sequences at least four base pairs in length.

(a) 5'-GCTTCGAAC-3'
3'-

(b) 5'-CTACTACTA-3'
3'-

(c) 5'-GCGCAACG-3'
3'-

(d) 5'-TTATTGCAAG-3'
3'-

(6) 2. When DNA polymerase inserts a new nucleotide into the growing DNA chain, a mistake in base pairing can be made if the base happens to be in the wrong tautomeric form. There are two mechanisms to correct this mistake. Describe them.

(9) 3. Deamination of bases can be a source of mutations in DNA. For each of the following possible deaminations, explain what type of mutation would occur in the DNA sequence, and how the mutation would be repaired:

(a) Deamination of Cytosine

(b) Deamination of Adenine

(c) Deamination of Guanine

(5) 4. Describe the role of a glycosylase and an AP endonuclease in excision repair.

(5) 5. Explain the role of the recBCD complex in recombination.

(5) 6. E. coli strains defective in Dam methylase have high mutation rates. Interestingly, strains that overproduce Dam methylase also have high mutation rates. Explain.

(5) 7. Diagram a Holliday junction between two DNA double strands, lebeling the 5'- and 3'- ends of each of the four DNA strands. (You need not draw a helix, but show where two strands are complementary and form a helix.)

(9) 8. Circle the following mutations which could result from a single base substitution. Give a codon change that could be responsible for the mutation. (The genetic code table is on the last page).

Glu ---> Thr	Leu ---> Terminate (Stop)	Lys ---> Pro
Val ---> Gly	Ile ---> His	Phe ---> Tyr

(9) 9. Eucaryotic cells have three types of RNA polymerase. Give the function of each and the sensitivity of each to α-amanitin.

(6) 10. What is the role of the sigma subunit in procaryotic RNA polymerase?

(6) 11. Eucaryotic DNA is linear rather than circular. What problem does that cause in the replicaton process, and how is the problem solved?

(6) 12. The following sequence from the middle of a m-RNA could encode three different polypeptide sequences. What are they?

5'-CACUACUGAGGCCUAA-3'

(12) 13. Eucaryotic mRNA is processed before it is used as a template for protein synthesis. Describe the processing reactions, showing some detail of the chemistry involved.

(9) 14. Identify the **G** proteins involved in protein synthesis, describing the function of each.