C5-MOLECULAR BASIS OF INHERITANCE

I. CHOOSE THE CORRECT ANSWERS **5 x1=5**

1. Which of the following is the correct sequence of event with reference to the central dogma?
   a) Transcription, Translation, Replication
   b) Transcription, Replication, Translation
   c) Duplication, Translation, Transcription
   d) Replication, Transcription, Translation
2. Which of the following statements is not true about DNA replication in eukaryotes?
   a) Replication begins at a single origin of replication.
   b) Replication is bidirectional from the origins.
   c) Replication occurs at about 1 million base pairs per minute.
   d) There are numerous different bacterial chromosomes, with replication ocurring in each at the same time.
3. What is the basis for the difference in the synthesis of the leading and lagging strand of DNA molecules?
   a) Origin of replication occurs only at the 5' end of the molecules.
   b) DNA ligase works only in the 3' --> 5' direction.
   c) DNA polymerase can join new nucleotides only to the 3' end of the growing stand.
   d) Helicases and single-strand binding proteins that work at the 5' end.
4. E. coli cell grown on 15N medium are transferred to 14N medium and allowed to grow for two generations. DNA extracted from these cells is ultracentrifuged in a cesium chloride density gradient. What density distribution of DNA would you expect in this experiment?
   a) One high and one low density band.
   b) One intermediate density band.
   c) One high and one intermediate density band.
   d) One low and one intermediate density band.
5. An operon is a:
   a) Protein that suppresses gene expression
   b) Protein that accelerates gene expression
   c) Cluster of structural genes with related function
   d) Gene that switched other genes on or off

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II VERY SHORT ANSWERS **6 x 2 = 6**

6. If the coding sequence in a transcription unit is written as follows:
   5' TGCATGCATGCATGCATGCATGCATGC 3'.
   Write down the sequence of mRNA.
7. Differentiate - Leading stand and lagging strand.
8. Why tRNA is called an adapter molecule?

III SHORT ANSWERS **3 x 3 = 9**

9. Distinguish between structural gene, regulatory gene and operator gene.
10. State any three goals of the human genome project.
11. What are the three structural differences between RNA and DNA?

IV LONG ANSWERS **1 x 5 = 5**

12. From their examination of the structure of DNA, What did Watson and Crick infer about the probable mechanism of DNA replication, coding capability and mutation?

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