

**II B.Tech II Semester Supplementary Examinations,
November/December 2005
MOLECULAR BIOLOGY
(Bio-Technology)**

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. Describe the various characteristics of the Watson-Crick DNA model. [16]
2. What are the requirements for the in vitro synthesis of DNA under the direction of DNA polymerase-I? [16]
3. What is a “TATA box” and what is its function? Do all promoters have TATA boxes? Why or why not? What provides the function of the TATA box when it isn't present? [16]
4. Describe the following terms: Transcription, translation, promoter. [16]
5. Describe different types of mutations; and explain the importance of mutations for genetic research. [16]
6. A point mutation occurs in a particular gene. Describe the types of mutational events that can restore a functional protein, including intergenic events. Consider missense, nonsense, and frameshift mutation. [16]
7. Describe the basis for chromosome mapping in the $Hfr \times F^-$ crosses. [16]
8. Write a note on Virus - mediated bacterial DNA transfer. [16]

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1. What are the roles of RNA primers and Okazaki fragments during DNA replication? [16]
2. DNA replication is bi-directional. What would the replication bubble look like (using the same labeling regimen as discussed in class) if replication was unidirectional? [16]
3. Where are each of the RNA polymerase types found in the eukaryotic cell? [16]
4. What is footprinting? How did it help define promoter sequences? [16]
5. What are mutagens? Classify the radiation, chemical mutagens that are affecting the organisms. [16]
6. Describe the Ames assay for screening potential environmental mutagens. Why is it though that a compound that tests positively in the Ames assay may also be carcinogenic? [16]
7. Describe the basis for chromosome mapping in the $Hfr \times F^-$ crosses. [16]
8. Why are IS elements sometimes referred to as selfish DNA? [16]

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1. Summarize and compare the properties of DNA polymerase- I, II and III. [16]
2. DNA replication is bi-directional. What would the replication bubble look like (using the same labeling regimen as discussed in class) if replication was unidirectional? [16]
3. What processing events occur with prokaryotic mRNA? [16]
4. Argue why the genetic code must be read 3 bases at a time rather than 2 bases. [16]
5. Write short notes on
 - (a) Thymine dimers
 - (b) Error prone Repair [16]
6. Write a note of Benzer's fine structure analysis of the rII locus of T4 bacteriophage. [16]
7. Describe the basis for chromosome mapping in the $Hfr \times F^-$ crosses. [16]
8. What are the properties of viruses? How do viruses differ from all type of cells? Why are viruses called obligate intracellular parasites? [16]

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1. Describe the various characteristics of the Watson-Crick DNA model. [16]
2. What are two differences between DNA and RNA? What bases pair with each other? [16]
3. Where are each of the RNA polymerase types found in the eukaryotic cell? [16]
4. Write a note on post-transnational modification. [16]
5. Describe different types of mutations; and explain the importance of mutations for genetic research. [16]
6. Which are the functional portions of a functional gene? [16]
7. Describe the basis for chromosome mapping in the $Hfr \times F^-$ crosses. [16]
8. Describe the mechanism of transduction process. [16]
