

STUDY GUIDE – THREE

BIO 220 - MICROBIOLOGY

This Exam will cover chapters 8, 9, & 11 in Tortora. As with previous exam it will be composed of a number of different question formats, including (but not limited to): short answer, essay, true/false, multiple choice, fill-in-the-blank, and drawing. This study guide is meant to aid you in your studying; it is not an exhaustive list of possible questions, or topics that could be covered. Please use this in conjunction with the notes you have taken and the lecture outlines I provide.

Supplemental Material on the Nature of Science and Evolution

1. List the requirements for acceptable science.
2. Define Evolution (not the simple definition).
3. Define Species.
4. Define Phenotype and Genotype.

Chapter 8 – Microbial Genetics

1. Describe, in detail, the experiments of Griffith and Avery, MacLoed, and McCarty, including a discussion of the results implications.
2. What two molecules were considered for the role of genetic carrier, before the above experiments?
3. What is a major difference between the structure of the common prokaryotic and eukaryotic chromosomes.
4. Name the nucleotides that make up DNA.
5. Describe the general structure of DNA; reference both the physical and chemical structures.
6. Name the scientists who produced the X-ray data used to determine the structure of DNA.
7. Name the scientists who elucidated the structure of DNA.
8. Discern the 5' → 3' direction of a DNA strand based on standard convention.
9. Produce the complementary strand to a given DNA strand, including directionality.
10. Define Semiconservative Replication.
11. Describe the process of replication, including a discussion of the leading and lagging strands.
12. What is proofreading, in reference to DNA replication?
13. Define gene.
14. Describe the three types of RNA.
15. Draw the central dogma for information flow in modern biology.
16. Define transcription.
17. Describe the process of transcription, including all three major steps with brief descriptions.
18. How does transcription differ between prokaryotes and eukaryotes in reference to location?

19. Define translation.
20. Where is translation accomplished?
21. Define codon, start codon, and nonsense codon.
22. Translate a given RNA sequence into its appropriate protein product.
23. Where is most regulation of genes accomplished?
24. Describe the difference between constitutive, repressible, and inducible genes.
25. Given a gene sequence and a mutation, describe the type of mutation and the protein products from the old and new sequence.
26. Describe transformation, transduction, and conjugation.

Chapter 9 – Biotechnology

1. Define Recombinant DNA Technology.
2. Describe the generalized procedure for rDNA technology; be sure to include the four major steps.
3. List two common usages of this technology.
4. Define Selection, Mutation, and Restriction Enzyme.
5. List the three major components of a successful vector.
6. Describe the Polymerase Chain Reaction.

Chapter 11 – Bacteria

1. You should be able to correlate the major genera of the chapter with representative diseases or conditions. Spelling will be important, as will characteristics.
2. Study the dichotomous keys and be able to produce a key given a set of characteristics.