General Biology A

Test Study Guide: Unit 4 – DNA Structure and Cell Division

Objective 1: Describe the structure of the DNA nucleotide and its place in the double helix.

Students will be able to:

1) Diagram the following structures: nucleotide, base pair, nitrogenous base, phosphate group, and Deoxyribose.
2) Describe the differences between purines and pyrimidines.
3) Describe the differences in bonds holding the structures together.
4) Describe the overall shape and structure of DNA.

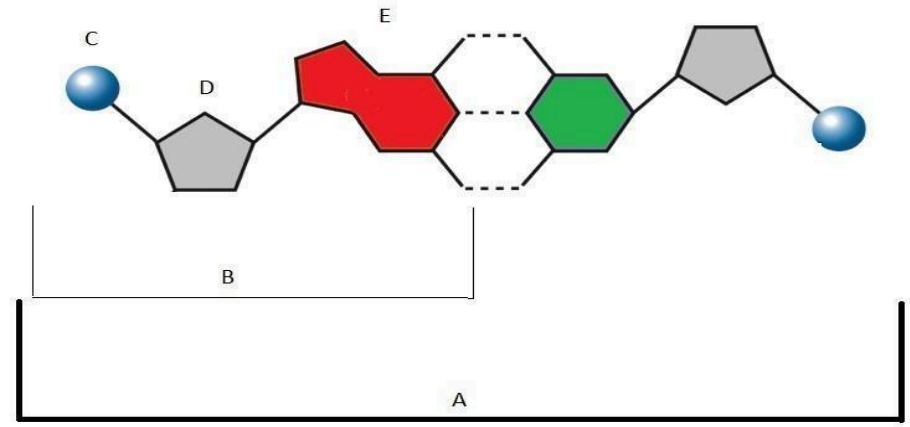
How to study:

a) Read pages: 220 – 223.

b) Define the following terms:

- Nucleotide:
- Nitrogenous Base:
- Purine:
- Pyrimidine:
- Adenine:
- Thymine:
- Cytosine:
- Guanine:
- Hydrogen bonds:
- Covalent bonds:
- Base pair:
- Double helix:

c) You should be able to draw and label the parts of the Visual Vocab diagram on Page 220.



Objective 2: Explain the pairing and sequencing of the nitrogenous bases and the process of DNA replication.

Students will be able to:

1) Describe the different nitrogenous bases in DNA.
2) Explain how the bases are paired.
3) If given a strand of DNA, be able to draw a replicated strand of DNA which corresponds to the original.
4) Describe the steps of the DNA replication process.
5) Identify and explain the function of each enzyme involved in DNA replication.
6) Describe what is used and what is produced at the end of the DNA replication process.
7) Describe when DNA replication occurs and explain why it is needed for cells.

How to study:

a) Read Pages: 220 – 223 and 225 – 228.

b) Define the following terms:
- Nucleotide:
- Nitrogenous Base:
- Purine:
- Pyrimidine:
- Adenine:
- Thymine:
- Cytosine:
- Guanine:
- Hydrogen bonds:
- Covalent bonds:
- Base pair:
- Double helix:
- DNA helicase:
- DNA polymerase:
- Free nucleotides:
- Replication fork:
- Enzyme:

c) You should be able to draw and label the parts of the Visual Vocab diagram on Page 220. You should be able to draw and label the parts of this diagram from memory: Figure 3.1 on Page 227.

Objective 3: Explain what genes are and what their function is.

Students will be able to:

1) Explain what genes are composed of.
2) Describe the function of genes and what they are used for.
3) Explain the difference between exons and introns.
4) Describe how a cell uses different genes to function.

How to study:

a) Read pages: 199 and 240-241.

b) Define the following terms:
   - Gene:
   - Exons:
   - Introns:

Objective 4: Explain the function of chromosomes and their composition.

Students will be able to:

1) Differentiate between genes, chromatin, sister chromatids, and chromosomes.
2) Explain what chromosomes are composed of.
3) Describe the function of chromosomes in eukaryotic cells.

How to study:

a) Read Pages: 134-135 Chapter 5

b) Define the following terms:
   - Gene:
   - Chromatin:
   - Chromatid:
   - Sister Chromatids:
   - Chromosome:
   - Histones:
   - Centromeres:
   - Telomeres:

c) Know these diagrams: Figure 2.2 on Page 135.

Objective 5: Explain how a cell divides (mitosis steps plus cytokinesis).

Students will be able to:

1) Identify the steps of the cell cycle.
2) Explain what occurs in each step/phase of the cell cycle.
3) Describe the need for the cell cycle and cell division.

How to study:

a) Read Pages: 136-137.
Read Pages: 140-143

b) Define the following terms:
- Centromere:
- Chromatid:
- Chromatin:
- Chromosome:
- Homologous chromosomes:
- Spindle fiber:
- Cell cycle:
- Interphase:
- Prophase:
- Metaphase:
- Anaphase:
- Telophase:
- Cytokinesis:
- Mitosis:
- Cancer

c) Know these diagrams: Figure 2.4 on Page 137.