

Chapter Four Study Guide (0723)
DNA Replication and the Cell Cycle (A)
Protein Synthesis (B)

Part A

- 1 What is a chromosome? Where are they stored? What are the monomers for chromosomes called? What is the polymer called? What will the information on the chromosome allow a cell to make?
- 2 What is the difference between mitosis and meiosis? What happens to the chromosome number after meiosis and mitosis cell division? Which type of cell division is haploid or diploid? What type of cell division is associated with somatic cells or gonadal cells?
- 3 What is a zygote? How and when is it created?
- 4 What are the four nucleotides of DNA? What type of bond allow the nitrogen bases to bond to each other? Which nucleotides are able to bond together? Significance.
- 5 What is the significance of the Law of Complementary Base Paring and the Law of Semi-Conservative Replication? Explain the significance of each law and draw a sketch to show how these laws ensure accurate transcription of the DNA molecule.
- 6 What are the key events in DNA replication? Draw a sketch and use these terms: parent DNA, replication fork, DNA polymerase, DNA helicase, old strand, incoming nucleotides, and new strand.
- 7 What is a mutation?
- 8 What is a cell cycle? How long is a typical cell cycle? Where would you find the fastest cell cycle?
- 9 What are the two phases in the cell cycle? In mitosis, what must happen before the cell enters the mitotic phase? Why? What must be conserved?
- 10 In the cell cycle during interphase, what are the three phases and what occurs in each phase? What is G Zero? What happens to the chromosome number and where? Why?
- 11 In the cell cycle, what happens in the mitotic phase? What role do centrosomes play in the mitotic phase?
- 12 What is the difference between chromatin, chromosome, chromatids, and daughter chromosomes? When and where would you use these terms? Draw a picture and label.
- 13 What is cytokinesis? When does this occur in the cell cycle?
- 14 What requirements must be met before a cell divides by mitosis? What will inhibit a cell from entering a new cell cycle?

Part B

- 15 How is molecular information encoded on the chromosome decoded and turned into a finished product? What type of molecule do we start with and what type of molecule do we end up with? What terms are used to describe the two step process and where do these events occur? Why do we call it information transfer?
- 16 What is the significance of these terms: base triplet, codon, and anticodon. To what structures are these terms associated with? How do they relate to each other?
- 17 What are the three forms of RNA required to make new protein? Is RNA a single strand or double strand of nucleic acid? Significance?
- 18 Draw a picture of how protein synthesis occurs and label events using these terms: rRNA, mRNA, tRNA, codon, and anticodon.
- 19 What is the significance of polyribosomal protein synthesis?
- 20 What are the six stages how molecular information in a gene is transferred from DNA into protein?