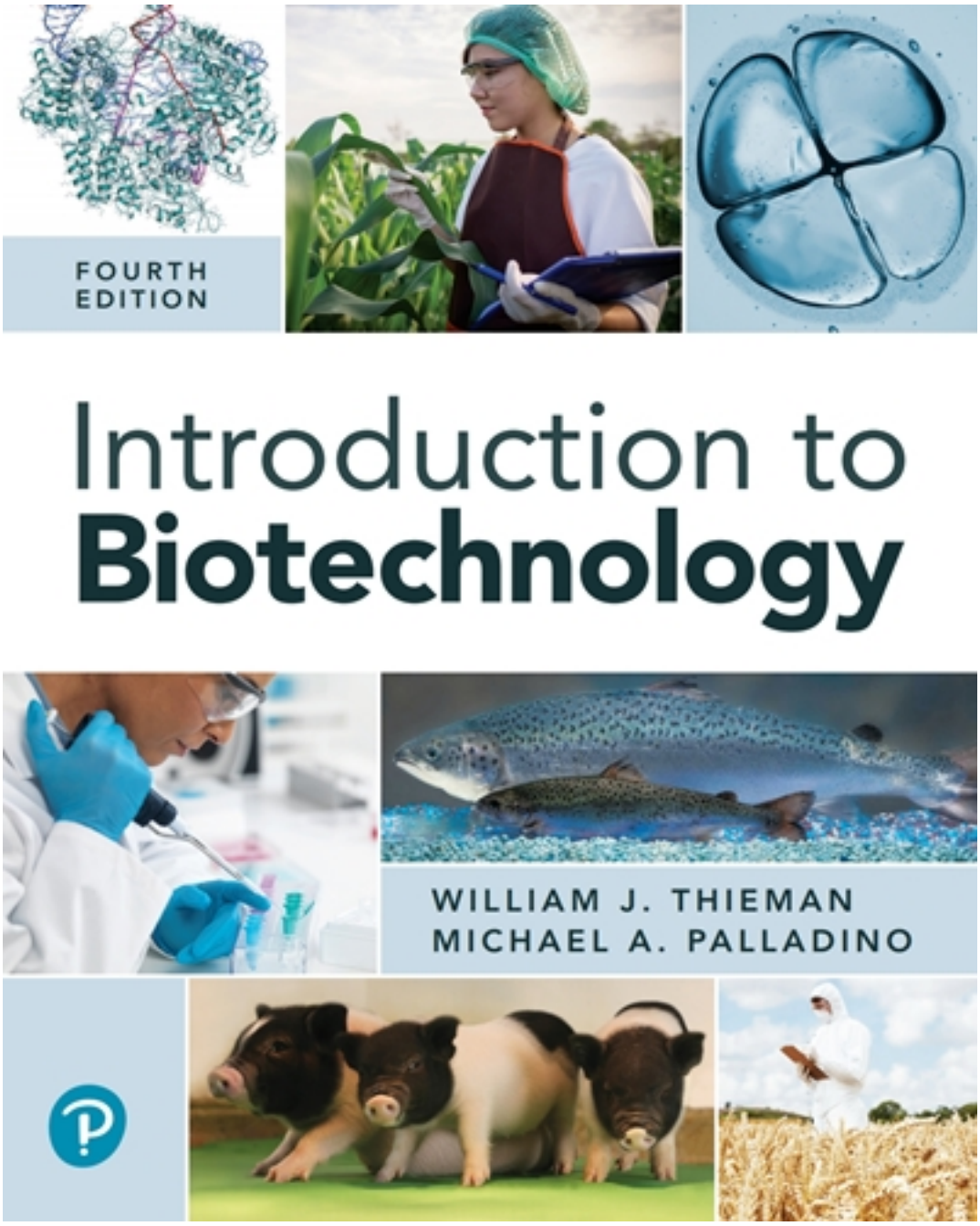
Test Bank for Introduction to Biotechnology 4th Edition by Thieman



Test Bank

Introduction to Biotechnology, 4e **(Thieman)**
Chapter 2 An Introduction to Genes and Genomes

1) The complementary base that hydrogen bonds with thymine in a DNA double helix is _____.
A) uracil
B) thymine
C) guanine
D) adenine
E) cytosine
Answer: D
Section: 2.2 The Molecule of Life
Bloom's Taxonomy: Remembering/Understanding

2) Which of the following is a structural feature of DNA but not RNA?
A) Single-stranded
B) Containing the nitrogenous base adenine
C) Containing phosphate groups
D) Containing deoxyribose sugars
E) Containing the nitrogenous base uracil
Answer: D
Section: 2.2 The Molecule of Life
Bloom's Taxonomy: Remembering/Understanding

3) Which type of base-pair substitution mutation has no effect on the amino acid sequence of a protein?
A) Missense mutation
B) Nonsense mutation
C) Silent mutation
D) Frameshift mutation
E) None of these choices
Answer: C
Section: 2.6 Mutations: Causes and Consequences
Bloom's Taxonomy: Remembering/Understanding

4) Which of the following is a characteristic of smooth endoplasmic reticulum (SER) but not rough endoplasmic reticulum (RER)?
A) Protein synthesis
B) Sending vesicles to the Golgi that contain proteins that are either secreted or become part of the plasma membrane
C) Steroid synthesis
D) Drug and alcohol detoxification
E) Steroid synthesis *and* drug and alcohol detoxification
Answer: E
Section: 2.2 The Molecule of Life
Bloom's Taxonomy: Remembering/Understanding

5) Which of the following enzymes is a component of the large ribosomal subunit and catalyzes the formation of peptide bonds between an amino acid attached to a peptidyl-tRNA and an amino acid from an aminoacyl-tRNA?
A) Reverse transcriptase
B) DNA polymerase
C) Peptidyl transferase
D) DNA ligase
E) β-galactosidase
Answer: C
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

6) Addition of a poly(A) tail to an mRNA molecule _____.
A) allows the mRNA to be recognized by ribosomes during translation
B) allows mRNA molecules to be more stable in the cytoplasm
C) results in removal of introns
D) only occurs in bacteria
E) is an important step in translation
Answer: B
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

7) What enzyme separates strands of DNA during DNA replication to make DNA single-stranded so it can be copied?
A) DNA primase
B) DNA polymerase
C) DNA helicase
D) DNA ligase
E) Reverse transcriptase
Answer: C
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

8) _____ bind to mRNA and tRNA during translation and allow for polypeptides to be synthesized.
A) Chloroplasts
B) Ribosomes
C) Nuclei
D) RNA polymerases
E) Chromosomes
Answer: B
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

9) _____ is the enzyme that copies DNA during DNA replication. Thermostabile forms of this enzyme are essential for PCR.
A) RNA polymerase
B) DNA ligase
C) DNA polymerase
D) RNA primase
E) DNA helicase
Answer: C
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

10) Which of the following is the typical start codon in most mRNA molecules?
A) UGA
B) AUG
C) AAA
D) GAA
E) CAG
Answer: B
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

11) Which type of point mutation creates a stop codon in a gene?
A) Nonsense
B) Frameshift
C) Silent
D) Missense
E) None of these choices
Answer: A
Section: 2.6 Mutations: Causes and Consequences
Bloom's Taxonomy: Remembering/Understanding

12) Nonprotein coding pieces of pre-mRNA that are removed during RNA splicing are called _____.
A) introns
B) exons
C) SNPs
D) promoters
E) poly(A) tails
Answer: A
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

13) Which organelles form the site of ATP production by aerobic cellular respiration?
A) Lysosomes
B) Mitochondria
C) Ribosomes
D) Golgi
E) Rough endoplasmic reticulum
Answer: B
Section: 2.1 A Review of Cell Structure
Bloom's Taxonomy: Remembering/Understanding

14) Which type of RNA molecules transport amino acids to the ribosome during translation?
A) rRNA
B) tRNA
C) siRNA
D) mRNA
E) miRNA
Answer: B
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

15) Which type of RNA molecule contains the genetic code of a gene that is read by ribosomes during translation?
A) rRNA
B) tRNA
C) siRNA
D) mRNA
E) miRNA
Answer: D
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

16) In a nucleotide of DNA, which carbon of the deoxyribose sugar binds to the base?
A) 1'
B) 2'
C) 3'
D) 4'
E) 5'
Answer: A
Section: 2.2 The Molecule of Life
Bloom's Taxonomy: Remembering/Understanding

17) Which of the following sequences is most commonly found at eukaryotic promoters?
A) TATAAAA
B) Poly(A) tail
C) 7-methyl G cap
D) 5'-GU . . . AG-3'
E) Shine-Dalgarno sequence
Answer: A
Section: 2.5 Regulation of Gene Expression
Bloom's Taxonomy: Remembering/Understanding

18) Which of the following is a commonly used stop codon in most mRNA molecules?
A) UGA
B) AUG
C) AAA
D) GAA
E) CAG
Answer: A
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

19) What is synthesis of RNA from a DNA template called?
A) Transformation
B) Reverse transcription
C) Transcription
D) Translation
E) None of these choices
Answer: C
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

20) Synthesis of a protein from an mRNA molecule is called _____.
A) transcription
B) translation
C) transformation
D) polymerization
E) polyadenylation
Answer: B
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

21) What is one role of the Golgi apparatus in cellular function?
A) Protein packaging
B) Replication of DNA
C) Protecting the integrity of the cell's shape
D) Filling the cell space with fluid
E) mRNA synthesis
Answer: A
Section: 2.1 A Review of Cell Structure
Bloom's Taxonomy: Remembering/Understanding

22) Which is NOT true of prokaryotes?
A) They contain ribosomes.
B) Their cells contain a true nucleus.
C) Their genes contain exons.
D) They include bacteria.
E) They are single-celled organisms.
Answer: B
Section: 2.1 A Review of Cell Structure
Bloom's Taxonomy: Remembering/Understanding

23) Which of the following is NOT a function performed in the nucleus?
A) Storing genes on chromosomes
B) Producing regulatory factors
C) Packaging proteins and transport them around the cell
D) Producing mRNA
E) DNA replication
Answer: C
Section: 2.1 A Review of Cell Structure
Bloom's Taxonomy: Remembering/Understanding

24) Which part of a gene codes for the protein?
A) Promoter
B) Exon
C) Intron
D) Enhancer
E) Transcription factor
Answer: B
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

25) Another term for a triplet code is _____.
A) an enhancer
B) a promoter
C) tRNA
D) a factor
E) a codon
Answer: E
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

26) Why is mRNA a good intermediate for translation?
Answer: mRNA is a good intermediate because it must leave the nucleus and go to the cytoplasm to direct translation. DNA is the genetic code and cannot leave the nucleus and risk degradation. So, mRNA can carry the DNA information to the cytoplasm without causing any risk of harm to the original DNA molecule.
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Applying/Analyzing

27) Give three differences between DNA and RNA.
Answer: DNA has the sugar deoxyribose and RNA has the sugar ribose.
DNA has the base Thymine and RNA has the base Uracil in place of Thymine.
DNA is double-stranded and RNA is single-stranded.
Section: 2.3 Chromosome Structure, DNA Replication, and Genomes
Bloom's Taxonomy: Applying/Analyzing

28) What is the difference between acquired and inherited mutations?
Answer: An acquired mutation is one that occurs in an organism after birth and throughout its life. It can be caused by, for example, too much exposure to radiation, which, over time, can cause a mutation or series of mutations that can lead to cancer. An inherited mutation is one in the germ line that can be passed from parent to offspring. For example, a person that has a gene that expresses a mutation for color blindness can be passed on from a parent to a child.
Section: 2.6 Mutations: Causes and Consequences
Bloom's Taxonomy: Applying/Analyzing

29) Why is it beneficial for the genetic code to be redundant?
Answer: Because there are several codons that code for each amino acid, there can be mutations that occur that change one nucleotide in the codon but still result in the same amino acid being produced. Thus, not all mutations will cause disease or render the protein inactive.
Section: 2.6 Mutations: Causes and Consequences
Bloom's Taxonomy: Applying/Analyzing

30) Briefly describe how Erwin Chargaff provided insight into the structure of DNA, and also describe how data from x-ray crystallography provided evidence about the structure of DNA.
Answer: Erwin Chargaff provided insight into the structure of DNA by isolating DNA from a variety of different species, which revealed that the percentage of adenine bases in an organism's DNA was proportional to the percentage of thymine bases, and the percentage of cytosine bases was roughly proportional to the percentage of guanine. This insight suggested that the bases adenine, thymine, cytosine, and guanine were somehow intricately related components of the DNA structure. X-ray crystallography provided further evidence about the structure of DNA because the data indicated that DNA could have a helical structure, which eventually led Watson and Crick to assemble a wire model of DNA.
Section: 2.2 The Molecule of Life
Bloom's Taxonomy: Applying/Analyzing

31) What is a more modern definition of a gene?
A) A unit of heredity that is voluntarily transferred from a parent to an offspring
B) A sequence of nucleotides that leads to the expression of a protein
C) Any DNA sequence that is used to produce RNA
D) An element of DNA that controls the characteristics that an offspring will have by transmitting information in the sequence of nucleotides to expressed proteins
E) An element of DNA that binds to proteins to induce translation
Answer: C
Section: 2.3 Chromosome Structure, DNA Replication, and Genomes
Bloom's Taxonomy: Remembering/Understanding

32) What is a technique that analyzes chromosome structure and abnormalities?
A) Flow cytometry
B) Cytogenetics
C) Gel electrophoresis
D) Southern blot
E) High pressure liquid chromatography
Answer: B
Section: 2.3 Chromosome Structure, DNA Replication, and Genomes
Bloom's Taxonomy: Remembering/Understanding

33) Which of the following techniques uses DNA probes to analyze chromosome structure and abnormalities?
A) Southern blot
B) Northern blot
C) PCR
D) Fluorescence in situ hybridization
E) Flow cytometry
Answer: D
Section: 2.3 Chromosome Structure, DNA Replication, and Genomes
Bloom's Taxonomy: Remembering/Understanding

34) Which of the following RNA molecules do NOT code for proteins?
A) ncRNA
B) tRNA
C) rRNA
D) mRNA
E) None of the above
Answer: A
Section: 2.4 RNA and Protein Synthesis
Bloom's Taxonomy: Remembering/Understanding

35) What is one RNA molecule that is associated with epigenetic and post-transcriptional gene expression regulation?
A) snRNA
B) tRNA
C) snoRNA
D) miRNA
E) piRNA
Answer: E
Section: 2.5 Regulation of Gene Expression
Bloom's Taxonomy: Remembering/Understanding

36) Which of the following RNA molecules is an example of a small noncoding RNA?
A) rRNA
B) tRNA
C) snoRNA
D) mRNA
E) lncRNA
Answer: C
Section: 2.5 Regulation of Gene Expression
Bloom's Taxonomy: Remembering/Understanding

37) What is a system that can be used to change or edit specific sequences in a genome?
A) Gas phase chromatography
B) Karyotyping
C) Fluorescence in situ hybridization
D) Cytogenetics
E) CRISPR-Cas
Answer: E
Section: 2.8 Immune Response Mechanism in Prokaryotes Results in Extraordinary New Technology
Bloom's Taxonomy: Remembering/Understanding