

Class:
Date:

Question #1
Dr. Wagner is investigating a newly discovered, disease-causing agent. She determines that one structure in the agent is double-stranded RNA. What kind of agent is Dr. Wagner studying?

- A) a virus
- B) a protist
- C) a fungus
- D) a bacterium

Question #2
Which structure does a virus have in common with a prokaryotic cell?

- A) cell wall
- B) nucleic acid
- C) ribosome
- D) capsid

Question #3
Based on Chargaff's rule for base pairing, if a DNA molecule contains 30.9% adenine, what is the MOST likely percentage of thymine?

- A) 19.8%
- B) 22.2%
- C) 29.8%
- D) 17.1%

Question #4
The complex, three-dimensional structure of a protein is sensitive to heat because the structure is maintained by

- A) hydrogen bonds.
- B) covalent bonds.
- C) Brownian motion.
- D) magnetic fields.

Question #5
Which describes the composition of carbohydrates?

- A) lipids bonding to form phospholipids
- B) monomers bonding to form polymers
- C) amino acids bonding to form polypeptides
- D) saccharides bonding to form polysaccharides

Question #6
Which type of substances serves as a catalyst for reactions that break large food molecules into smaller useful molecules?

- A) enzymes
- B) vitamins
- C) lipids
- D) nucleotides

Question #7
What characteristic of double-stranded DNA determines the ability of one strand to make an exact copy of the other strand?

- A) complementary pairing of bases
- B) hydrogen bonding between strands
- C) ability of bases to be connected in any order
- D) location of the base pairs in the center of helix

Question #8
A DNA strand undergoing replication contains the bases TACGTT. Which complementary strand does it produce?

- A) AUCGAA
- B) ATGCAA
- C) ATCGAA
- D) AUCGTT

Question #9
How is the DNA sequence AATTA replicated in a new strand during semiconservative replication?

- A) AATTA
- B) AATAA
- C) TTAATT
- D) TTAAT

Question #10
How many amino acids can be represented by a single 3-base DNA sequence?

- A) 1
- B) 3
- C) 6
- D) 8

Question #11
What is a benefit of the regulation of gene expression?

- A) conservation of genetic information
- B) conservation of cell resources
- C) trait adaptation to environmental change
- D) trait inheritance in offspring

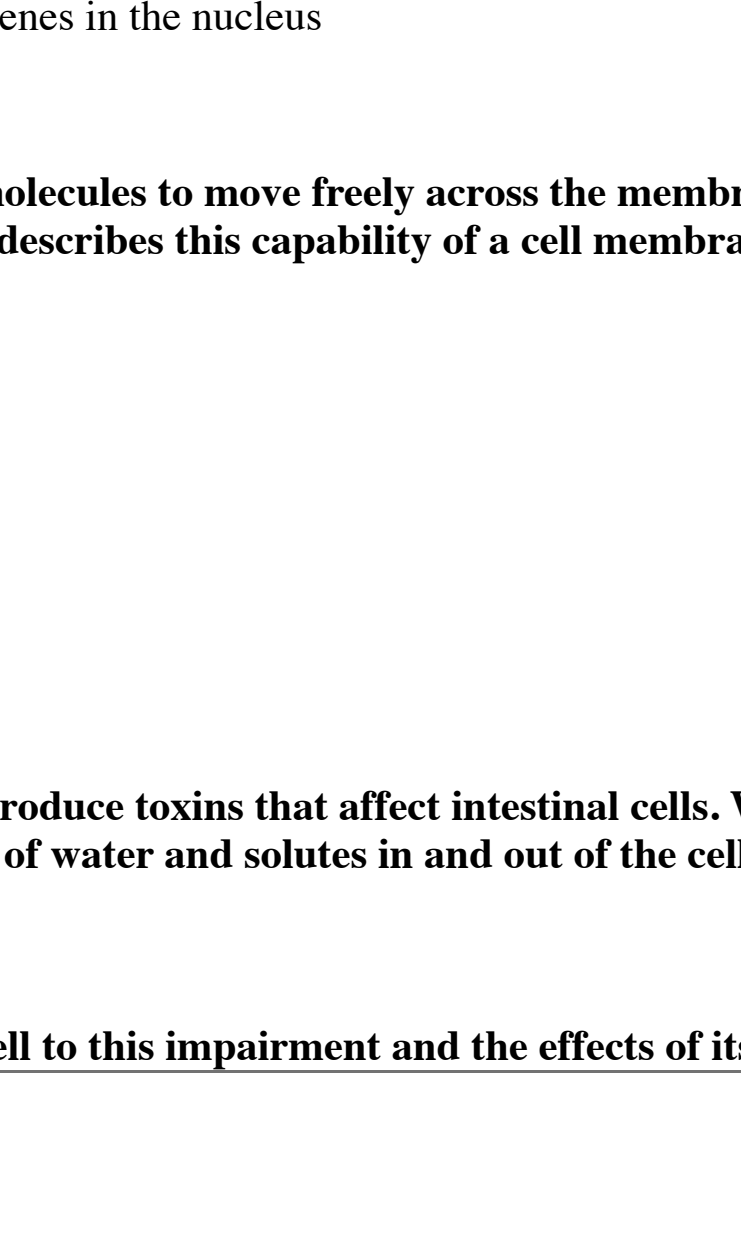
Question #12
The process of gene regulation directly impacts

- A) how much DNA is stored.
- B) how much DNA is replicated.
- C) which mRNA is produced.
- D) which tRNA is produced.

Question #13
The DNA sequence ACTCG produces which mRNA sequence during transcription?

- A) TGAGC
- B) UGAGC
- C) ACTCG
- D) ACUCG

Question #14
The chart below shows that the amino acid serine is coded for by the nitrogenous bases uracil-cytosine-adenine (UCA).



According to the RNA Codon Chart, which of the following statements is true?

- A) AAA is the only code for lysine.
- B) AUG codes for both methionine and valine.
- C) Isoleucine is the only amino acid coded for by AUU.
- D) Arginine is one of several amino acids coded for by AGA.

Question #15
Cell differentiation is the result of gene expression. Genes can be regulated several ways. For example, small interference RNA molecules (siRNA), prevent gene expression by binding to the product of transcription. How do siRNA molecules silence genes?

- A) They bind to ribosomes.
- B) They bind to tRNA.
- C) They bind to RNA polymerase.
- D) They bind to mRNA.

Question #16
Some plant cells are coated in a waxy layer that prevents water loss. This specialization is found in which plant cells?

- A) internal stem cells
- B) internal root cells
- C) cells on the plant surface
- D) cells in the plant reproductive system

Question #17
Which of the following allows a cell to become specialized?

- A) location of the cell in the body
- B) function of the cell in the body
- C) different patterns of gene expression
- D) different combinations of genes in the nucleus

Question #18
Cell membranes allow some molecules to move freely across the membrane, while other molecules are restricted. Which term BEST describes this capability of a cell membrane?

- A) semipermeable
- B) impervious
- C) resilient
- D) unyielding

Question #19
Salmonella are bacteria that produce toxins that affect intestinal cells. When affected by Salmonella, the ability to regulate the flow of water and solutes in and out of the cell is impaired.

Describe the response of the cell to this impairment and the effects of its response.

Question #20
Which of these genetic disorders will MOST likely inhibit active transport across cellular membranes?

- A) hemophilia
- B) cystic fibrosis
- C) Down syndrome
- D) mitochondrial disease

Question #21
Scientists have discovered that some organic molecules can self-assemble into lipid bilayer droplets called microspheres. If these microspheres form around enzymes, a simple form of metabolism can occur inside the microspheres. What characteristic of these microspheres allows them to take in substrates for metabolism?

- A) their electric potential
- B) their self-organization
- C) their selective permeability
- D) their spherical shape

Question #22
Which type of organism would MOST likely benefit directly from increased levels of CO₂?

- A) fish
- B) bird
- C) tree
- D) mushroom

Question #23
Use the components CO₂, O₂, H₂O, C₆H₁₂O₆, and energy to construct balanced equations for photosynthesis and cellular respiration.

Question #24
The diagram shows the process of photosynthesis.

What type of energy transformation occurs during photosynthesis?

- A) heat energy to electrical energy
- B) kinetic energy to electrical energy
- C) potential energy to chemical energy
- D) electromagnetic energy to chemical energy

Question #25
Plants make sugars in the presence of sunlight in a process called photosynthesis. What form of carbon do the plants take in for this process?

- A) glucose molecule
- B) carbon dioxide
- C) single carbon atoms
- D) complex organic compounds