



I.D. #: G:

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11. Triglycerides, polysaccharides, nucleic acids, and proteins are all biological polymers whose monomer subunits (precursors) are linked together by:
- Hydrolysis reactions.
  - Condensation reactions.
  - Phosphodiester linkages.
  - Peptide bonds.
  - Hydrogen bonds.
12. Which of the following is the correct order for the relative strengths of chemical bonds?
- Covalent > ionic > hydrogen > van der Waal forces
  - Ionic > covalent > hydrogen > van der Waal forces
  - Van der Waal forces > covalent > ionic > hydrogen
  - Covalent > hydrogen > van der Waal forces > ionic
  - Ionic > covalent > van der Waal forces > hydrogen
13. The atoms that make up carbohydrates are
- C, H, and N
  - C and H
  - C, H and P
  - C, H, and O
  - C, H, O, and N.
14. A *nucleotide* contains a pentose (5C) sugar, a phosphate, and a(n)
- Nothing else
  - Glycerol
  - Nitrogen-containing base
  - Amino acid
  - Really awesome wave, Dude! 😊
15. Which of the following is NOT true about proteins?
- Are composed of amino acids linked by peptide bonds.
  - May function in assemblies of several polypeptide chains (multiple subunits).
  - May function as biological catalysts.
  - May function in structural support of cells.
  - Primary structure is maintained by strong hydrogen-bonding.
16. The \_\_\_\_\_ structure of a protein relates to how separate polypeptides assemble together.
- Primary
  - Secondary
  - Tertiary
  - Quaternary
  - Helical
17. Where would you likely find phenylalanine (hydrocarbon ring sidechain) in a mature, fully folded protein?
- In the hydrophilic central core of a globular protein.
  - On the hydrophilic surface of a globular protein.
  - In the hydrophobic central core of a globular protein.
  - In the hydrophobic transmembrane region of an integral membrane protein.
  - Both (c.) and (d.)
18. In a biological membrane, the phospholipids are arranged with the fatty acid chains facing the interior of the membrane. As a result, the interior of the membrane is
- Hydrophobic
  - Hydrophilic
  - Charged
  - Polar
  - Filled with water
19. What is the nucleotide sequence of the complementary strand of this DNA molecule:  
5'-AATGCGA-3'
- 5'-TTACGCT-3'
  - 5'-AATGCGA-3'
  - 5'-GGCATAG-3'
  - 5'-TCGCATT-3'
  - 5'-AGCGTAA-3'
20. A type of protein that functions by helping the correct folding of other proteins is called
- Foldzyme
  - Renaturing protein
  - Chaperonin
  - Hemoglobin
  - Denaturing protein
21. Which of the following is NOT a characteristic of a prokaryotic cell?
- A plasma membrane
  - A nuclear envelope
  - A nucleoid
  - Ribosomes
  - A cell wall
22. The amino acids of the protein keratin (in skin and hair) are arranged in an alpha-helix. This secondary structure is stabilized by
- Covalent bonds
  - Peptide bonds
  - Hydrogen bonds
  - Polar bonds
  - Barry Bonds 😊
23. Ribosomes are important because they are the structures where
- Chemical energy is stored in making ATP
  - Cell division is controlled
  - Genetic information is used to make proteins
  - Sunlight energy is captured into chemical energy
  - New organelles are made
24. Which of the following features of eukaryotic cells is NOT also found in prokaryotic cells?
- Cytoplasm
  - Ribosomes
  - Plasma membrane
  - Flagella composed of microtubules
  - Metabolic enzymes

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25. What cellular compartment is responsible for the storage, modification, and packaging of proteins for delivery?
- Rough ER
  - Smooth ER
  - Golgi Apparatus
  - Nucleolus
  - Mitochondrion
26. Cholesterol and steroids, like other lipids, are synthesized in the
- Rough ER
  - Smooth ER
  - Golgi apparatus
  - Nucleolus
  - Home of the Double Western Bacon Cheeseburger ☺
27. Which of the following statements is NOT true about the Fluid Mosaic Model of the cell membrane?
- Membrane proteins “float” in a lipid “lake”.
  - Proteins and lipids freely diffuse transversely (“flip-flop”) in the membrane.
  - Phospholipids spontaneously form a bilayer membrane in aqueous solution.
  - Proteins and lipids freely diffuse laterally in the membrane.
  - The molecular content of the phospholipid bilayers may differ between different cells in the same organism or between different organisms.
28. The major factor limiting cell size is the
- Concentration of water in cytoplasm
  - Need for energy
  - Presence of organelles surrounded by membranes
  - Ratio of surface area to volume
  - Thickness of the plasma membrane
29. Adhesive protein structures that hold adjacent cell together while allowing exchange of small particles between the cytoplasm are called
- Extracellular matrices
  - Glycoproteins
  - Gap junctions
  - Desmosomes
  - Tight Junctions
30. Proteins for use in the cellular membranes or outside of the cell are synthesized
- In the Golgi
  - In vesicles
  - In the rough ER
  - In the Smooth ER
  - In the cytoplasm
31. Substances at low concentrations outside of a cell may enter the more highly concentrated cytoplasm by
- Simple diffusion
  - Active transport
  - Facilitated Diffusion
  - B and C
  - Use of StarFleet teleportation devices. ☺
32. Competitive and noncompetitive enzyme inhibitors differ with respect to
- The precise location on the enzyme to which they bind
  - Their pH
  - Their binding affinities
  - Their energies of activation
  - None of the above
33. Which of the following determines the rate of a reaction?
- $\Delta S$
  - $\Delta G$
  - $\Delta H$
  - The activation energy
  - The overall change in free energy
34. The process that involves an end product acting to block an earlier step in its own metabolic pathway is called
- Cooperativity
  - Feedback inhibition
  - Positive feedback
  - Irreversible inhibition
  - Too much habañero sauce! ☺
35. When an enzyme catalyzes both an energy-releasing reaction and an energy-absorbing reaction and exchanges energy between the two, the reactions are said to be
- Substrates
  - Endergonic
  - Kinetic
  - Activated
  - Coupled

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**Short Essays (40 pts total):** On the **NEXT PAGE**, answer **ONLY TWO** of the following 3 questions **BRIEFLY** but **COMPLETELY**. Use diagrams whenever requested or appropriate.

➤ **[Answer ONLY on the following page.....]**

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- 36.** (20 pts) Briefly explain how Louis Pasteur's experiments disproved the prevailing theories of the origin of life during his time, when the scientific community did not accept previous results from experiments by other scientists. Also mention how Pasteur's conclusions are consistent with the current Cell Theory.
- 37.** (20 pts) Describe three differences between simple diffusion and primary active transport across a biological membrane. Also, what are two properties of a transported substance that strongly affect its rate of simple diffusion across a cellular membrane?
- 38.** (20 pts) Explain how two different biochemical polymers, composed of the exact same monomer (such as glucose), might have very different chemical properties and biological functions (such as: easily broken down for energy, vs. strong and stable for cell structural support). Give an example, if possible.

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## BIOL230 AA/AB PRACTICE MIDTERM #1

### Answer Key -- Fall Semester

*Only look here AFTER you have thoughtfully and thoroughly completed the Practice Exam!!! NO CHEATING!!*

1.	B
2.	E
3.	C
4.	B
5.	D
6.	C
7.	C
8.	E
9.	D
10.	D
11.	B
12.	A
13.	D
14.	C
15.	E
16.	D
17.	E
18.	A
19.	D
20.	C
21.	B
22.	C
23.	C
24.	D
25.	C
26.	B
27.	B
28.	D
29.	C
30.	C
31.	B
32.	A
33.	D
34.	B
35.	E