

BIOLOGY 205
Midterm I - 27 April 2007
(90 points total)

Name _____

Multiple choice questions – 3 points each (please circle the letter of single best answer).

1. The **fundamental unit of life** is the
 - A. membrane.
 - B. organelle.
 - C. cell.
 - D. organism.
 - E. community.

2. DNA differs from RNA in
 - A. the number of different nitrogenous bases available.
 - B. the number of phosphates between sugars in the sugar-phosphate backbone.
 - C. the ability to polymerize in the 5' to 3' direction.
 - D. the use of a phosphodiester linkage.
 - E. the absence of a hydroxyl attached to the 2' carbon of the sugar subunit.

3. Which one of the following is **NOT** considered one of the four major 'macromolecules' found in cells?
 - A. polysaccharides
 - B. nucleic acids
 - C. lipids
 - D. proteins
 - E. ATP

4. Which of the following is **NOT** a fundamental concept used throughout the study of biology:
 - A. emergent properties
 - B. spontaneous generation
 - C. hypothesis testing & deductive reasoning
 - D. natural selection
 - E. hierarchical organization

5. In plant cells, which of the following constitutes an **analogous structure** to the extracellular matrix in the epithelial cells of animal cells?
 - A. cell wall
 - B. plasmodesmata
 - C. tonoplast
 - D. plastids
 - E. contractile vacuole

6. When comparing the different levels of protein structure, which is/are best described by the occurrence of an **α -helix**?
- A. primary
 - B. secondary
 - C. tertiary
 - D. quaternary
 - E. all of the above
7. What type of polysaccharide is it that has the most **covalent cross-linking** associated with its polymerized chains?
- A. cellulose
 - B. starch
 - C. glycogen
 - D. amylopectin
 - E. sucrose
8. When a protein loses its **tertiary structure** and becomes nonfunctional, it is
- A. permanent.
 - B. reversible.
 - C. environmentalized.
 - D. denatured.
 - E. hydrolyzed.
9. **Tight junctions** serve an important function in epithelial cell layers by
- A. restricting the extracellular movement of molecules between the adjacent cells.
 - B. allowing nerve impulses to move from one cell to the next.
 - C. providing cytoplasmic channels between adjacent cells.
 - D. providing channels between the cytoplasm and the extracellular environment.
 - E. acting as recognition sites for foreign substances.
10. When transport vesicles from the Golgi apparatus deliver their contents to the exterior of the cell, they add their membranes to the plasma membrane. Why doesn't the **plasma membrane** increase in size?
- A. Some vesicles from the Golgi apparatus fuse with the lysosomes.
 - B. Membrane vesicles carry proteins from the endoplasmic reticulum to the Golgi apparatus.
 - C. Membrane is continually being lost from the plasma membrane by endocytosis.
 - D. New phospholipids are synthesized in the endoplasmic reticulum.
 - E. The phospholipids become more tightly packed together in the membrane.

Matching – 2 points each. Use single best answer to match the organelle with the characteristic/process that is best described or associated with it. The possible answers are: **A.** Ribosomes, **B.** Mitochondria, **C.** Lysosome, **D.** Nucleus, and **E.** Chloroplast.

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|-----|-------|-------------------|-----|-------|-----------------------------------|
| 11. | _____ | Apoptosis | 16. | _____ | Phagocytosis (endosome formation) |
| 12. | _____ | Oxygen source | 17. | _____ | Thylakoid membrane |
| 13. | _____ | Protein synthesis | 18. | _____ | Chromatin |
| 14. | _____ | Acid Hydrolases | 19. | _____ | Cristae |
| 15. | _____ | Matrix | 20. | _____ | RNA processing |

True or False – (2 points each)

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|-------|--|
| _____ | 21. Kinesin and Dynein are both important motor molecules that interact directly with intermediate filaments. |
| _____ | 22. When plant cells undergo cytokinesis, a cell plate is produced by vesicles originating from the nucleolus. |
| _____ | 23. Microtubules are required for the development of the cleavage furrow in animal cells. |
| _____ | 24. The nuclear lamina is a network of actin filaments just inside the nuclear envelope. |
| _____ | 25. ATP is the universal energy carrier inside the cell, getting turned over rapidly and often. |
| _____ | 26. The most abundance polymer on Earth is chitin. |
| _____ | 27. Glycogen includes both α -1,4 and β -1,4 types of linkages. |
| _____ | 28. RNA is a specialized version of DNA, better at information storage. |
| _____ | 29. Cytoplasmic streaming is generated by the movement associated with microtubules. |

Short answer – Number of points in parentheses.

- 30. (5 points)** Some proteins require exposure to only hydrophobic zones within the cell to fold correctly. Briefly describe how AND where an integral protein with this requirement gets synthesized?
- 31. (5 points)** Compare and contrast the structure and function of the external and internal regions of the eukaryotic flagella with respect to the configuration of microtubules.
- 32. (5 points)** What specifically is the role of clathrin in relationship to coated pits AND what type of process does this represent?

33. (7 points) (A) Compare and contrast the shape of most animal cells with respect to most plant cells in terms of osmotic potential? (B) What is it that osmosis requires that sets it apart from simple diffusion?

34. Extra Credit (progressive point bonus, i.e., first one wrong and game over): Name up to four different “semi-autonomous” organelles AND correctly describe each one's cellular function:

A. (1 point) –

B. (2 points) –

C. (4 points) –

D. (8 points) –