BIOLOGY 205 **Name _____**
Midterm I - 30 January 2012
(100 points total)

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

1. What type of polysaccharide is it that has the most **hydrogen bond cross-linking** associated with its polymerized chains?

A. cellulose
B. starch
C. glycogen
D. amylopectin
E. sucrose

2. The **sodium-potassium pump** is an example of:

A. Uniporter actively moving against a concentration gradient
B. Symporter passively moving with a concentration gradient
C. Uniporter passively moving with a concentration gradient
D. Antiporter actively moving against a concentration gradient
E. Antiporter passively moving with a concentration gradient

3. Of the following, which is NOT considered a feature and/or description of the **golgi apparatus**?

A. forms the phragmoplast in plant cells
B. sends and receives transport vesicles
C. cis-side vesicles heading to the plasma membrane
D. considered part of the endomembrane system
E. consists of a collection of flattened sacs known as cisternae

4. Consider the **second** major endosymbiotic jump that occurred within the eucaryotic lineage. What type of cellular achievement was responsible for this bacterium getting accepted into the eucaryote club?

A. aerobic respiration
B. photosynthesis
C. methanogenesis
D. fermentation
E. membrane bound nucleus

5. In plant cells, which of the following constitutes an **analogous structure** to the conduits known as gap junctions found in animal cells?

A. cell wall
B. plasmodesmata
C. tonoplast
D. plastids
E. contractile vacuole

6. Consider the eukaryotic cytoskeleton. Which of the following is NOT considered a characteristic that involves **microtubules**?

A. 9 + 2 pattern in cilia
B. dynein walking
C. centrioles
D. cytoplasmic streaming
E. spindle formation

7. Of all the types of chemical bonds, which of the following is capable of the **strongest attractive force** linking atoms together?

A. van der Waals attractions
B. hydrogen bonds
C. ionic bonds
D. covalent bonds
E. organic bonds

8. **Lipids** are a diverse group of primarily hydrophobic macromolecules. Which of the following compounds are NOT considered lipids?

A. vitamin A
B. cholesterol
C. phosphatidylcholine
D. cytosine
E. triglyceride

9. The **nucleoli** (nucleolus if only one), aside from being a sub-component of the cell's nucleus, are best characterized by which of the following properties?

A. histone generation
B. chromosome condensation
C. membrane production
D. ribosome assembly
E. necessary for S phase

10. 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

Matching – 2 points each. Use single best answer to match the organelle or cell type with the characteristic and/or process that is best described or associated with it. The choices may be used once, more than once, or not at all. The choices are: **A.** Ribosome, **B.** Mitochondria, **C.** Lysosome, **D.** Nucleus, and **E.** Plastid.

11.	_____	Endosome	**16.**	_____	Chromoplast
12.	_____	RNA processing	**17.**	_____	Makes ER into RER
13.	_____	Protein synthesis site	**18.**	_____	Thylakoid membrane
14.	_____	Apoptosis	**19.**	_____	Acid Hydrolases
15.	_____	Chromatin	**20.**	_____	Zero membranes

Matching – 2 points each. Consider the bonds formed by condensation reactions for the major biological polymers and/or macromolecules. Match the single best answer with the statements below. The choices may be used once, more than once, or not at all. The choices are: **A.** Nucleic acids, **B.** Polysaccharides, **C.** Lipids, **D.** Proteins, **E.** Produced, and **F.** Consumed.

21. _____ Ester linkage

22. _____ Glycosidic linkage

23. _____ Phosphodiester linkage

24. _____ Peptide linkage

25. _____ Water gets ????? during the destruction of each of these bonds?

True or False – (2 points each)

26. _____ The most abundant polymer on Earth is chitin, which is polymerized by glycosidic linkages.

27. _____ Plant cells are usually considered flaccid in a hypertonic solution.

28. _____ The nuclear lamina is a network of actin filaments just inside the nuclear envelope.

29. _____ Denaturing a protein mostly affects its primary structure.

30. _____ The nucleus is a semi-autonomous organelle.

Short answer – Number of points in parentheses.

31. **(6 points)** Why are most cells microscopic in size? What would be the problem if cells typically had an extremely large volume?

32. **(6 points)** Consider the major types of macromolecules that are required to build a cell. (A) Of these, which one is the most abundant found in an idealized cell? (B) Of these (from A), which type specializes in carrying information? (C) Of these (from B), which specific polymer is an information storage specialist and give one reason why?

33. **(4 points)** What is it (in terms of compartmentalization) that defines osmosis apart from simple diffusion?

34. **(4 points)** Consider the major types of macromolecules that are required to build a cell. (A) Of these, which one is NOT technically a polymer? (B) What type of interactions are necessary to cause these macromolecules to stick together?

35. **(4 points)** In general, what is the primary purpose for having a **chaperonin**? More specifically, what does having a chaperonin prevent/protect from happening?

36. **(6 points):** Consider the "idealized" cell. Starting on the outside of an animal cell and moving to inside the matrix of a mitochondrion, what are the minimum number of membranes you would have to cross AND what are each of their names?

37. **Extra Credit (6 points max):** Name the **cytoskeleton** component most responsible for the following characteristics **AND** state a good reason as to how or why it is involved with this scenario:

A. **(2 points)** causes movement of organelles from various locations inside the cell –

B. **(2 points)** responsible for cytoplasmic streaming inside a plant cell –

C. **(2 points)** chromatophore contraction causing color change in fish scale cell –