Practice questions Chapter 6.

1. Which of the following is the simplest collection of matter that can live? (Overview)
   - cell
   - tissue
   - organ
   - molecules
   - none of the above

2. Cell fractionation _____. (Concept 6.1)
   - results in the disruption of the cells and their organelles
   - requires the use of a scanning electron microscope
   - uses strong acids to break apart cells
   - is no longer used in modern cell biology
   - none of the above

3. The average wavelength of visible light is about 550 nanometers (or 0.5 micrometers). Which of the following cellular structures is **unlikely** to be resolved with a light microscope? (Concept 6.1)
   - the nucleus, which is typically about 5 micrometers in diameter
   - chromosomes in the nucleus during cell division
   - nuclear pore complexes (100 nanometers in diameter) on the nuclear membrane
   - a typical bacterial cell, which is between 0.5 and 2.0 micrometers in diameter
   - a typical eukaryotic cell, which is between 10 and 100 micrometers in diameter
Which of the following structures is found in eukaryotic but not prokaryotic cells? (Concept 6.2)

- cytosol
- plasma membrane
- mitochondria
- ribosomes
- RNA

A substance moving from outside the cell into the cytoplasm must pass through _____. (Concept 6.2)

- a microtubule
- several different organelle membranes
- a ribosome
- the nucleus
- the plasma membrane

In terms of cellular function, what is the most important difference between prokaryotic and eukaryotic cells? (Concept 6.2)

- Only eukaryotic cells can synthesize proteins but prokaryotic cells cannot.
- Only eukaryotic cells have DNA.
- Compartmentalization of the cytoplasm by membrane-bounded organelles only occurs in eukaryotic cells.
- Eukaryotic cells have a plasma membrane and prokaryotic cells do not.
- Eukaryotic cells are larger than prokaryotic cells.

Bacterial cells are prokaryotic; unlike a typical eukaryotic cell they _____. (Concept 6.2)
lack chromosomes
have a smaller nucleus
lack a plasma membrane
have no membrane-bounded organelles in their cytoplasm
have no ribosomes

Which of the following features do prokaryotes and eukaryotes have in common? (Concept 6.2)

- mitochondria, cytoplasm, plasma membrane
- ribosomes, plasma membrane, cytoplasm
- nucleus, plasma membrane, ribosomes
- mitochondria, ribosomes, cytoplasm
- ribosomes, nucleus, plasma membrane

A certain cell has ribosomes and DNA, and is surrounded by a membrane. But there are no mitochondria present. Based on this information, this cell is most likely _____. (Concept 6.2)

- a cell from a pine tree
- a grasshopper cell
- a yeast (fungus) cell
- a bacterium
- The description above could fit any of the cells listed in the answers.

What is the functional connection between the nucleolus, nuclear pores, and the nuclear membrane? (Concept 6.3)

- Subunits of ribosomes are assembled in the nucleolus and pass through the nuclear membrane via the nuclear pores.
The nuclear pores are connections between the nuclear membrane and the endoplasmic reticulum that permit ribosomes to assemble on the surface of the ER.

The nucleolus contains messenger RNA (mRNA), which crosses the nuclear envelope through the nuclear pores.

Endoplasmic reticulum membrane is produced in the nucleolus and leaves the nucleus through the nuclear pores.

none of the above

Of the following organelles associated with the endomembrane system, which group is primarily involved in synthesizing molecules needed by the cell? (Concept 6.4)

- lysosome, vacuole, ribosome
- ribosome, rough endoplasmic reticulum, smooth endoplasmic reticulum
- vacuole, rough endoplasmic reticulum, smooth endoplasmic reticulum
- smooth endoplasmic reticulum, ribosome, vacuole
- rough endoplasmic reticulum, lysosome, vacuole

Which of the following categories best describes the function of the rough endoplasmic reticulum? (Concept 6.4)

- breakdown of complex foods
- energy processing
- manufacturing
- structural support of cells
- information storage

You would expect a cell with an extensive Golgi apparatus to _____. (Concept 6.4)

- make a lot of ATP
A researcher made an interesting observation about a protein made by the rough endoplasmic reticulum and eventually used to build a cell's plasma membrane. The protein in the plasma membrane was actually slightly different from the protein made in the ER. The protein was probably altered in the _____. (Concept 6.4)

- Golgi apparatus
- smooth endoplasmic reticulum
- plasma membrane
- transport vesicles
- rough endoplasmic reticulum

Which type of cell is most likely to have the most mitochondria? (Concept 6.5)

- muscle cells in the legs of a marathon runner
- photosynthetic cells in the leaves of a tree
- bacterial cells that are growing on sugars
- inactive yeast cells that are stored for future use
- non-dividing cells in the skin on your finger

Which of the following is/are true? (Concept 6.5)

- Mitochondria are involved in energy metabolism.
- Mitochondria have more than one membrane.
- Mitochondria contain DNA and ribosomes.
Mitochondria are independent of the endomembrane system.

Which of the following cellular processes or characteristics is/are related to the cytoskeleton? (Concept 6.6)

- transmission of information from the cell surface to the interior of the cell
- movement of the chromosomes during cell division
- movement of cilia or flagella
- contraction of muscle cells
- all of the above

Which of the following structures are found in plant cells and animal cells? (Concept 6.6)

- cell walls
- chloroplasts
- central vacuoles
- a cytoskeleton
- none of the above

Where would you expect to find proteins involved with movement of structures within a cell? (Concept 6.6)

- muscles
- cytoskeleton
- transport vesicles moving from the ER to the Golgi
- plasma membrane
- ribosomes

Which of the following organelles lack membranes as part of their structure? (Concept 6.6)
Dye injected into a plant cell might be able to enter an adjacent cell through _____. (Concept 6.7)

- a tight junction
- a microtubule
- a cell wall
- plasmodesmata
- a gap junction

1. Cell
3. results in the disruption of the cells and their organelles
4. nuclear pore complexes (100 nanometers in diameter) on the nuclear membrane
7. mitochondria
8. the plasma membrane
9. Compartmentalization of the cytoplasm by membrane-bounded organelles only occurs in eukaryotic cells
10. have no membrane-bounded organelles in their cytoplasm
11. ribosomes, plasma membrane, cytoplasm
12. a bacterium
13. Subunits of ribosomes are assembled in the nucleolus and pass through the nuclear membrane via the nuclear pores
15. ribosome, rough endoplasmic reticulum, smooth endoplasmic reticulum
18. manufacturing
19. secrete a lot of protein
20. Golgi apparatus
29. muscle cells in the legs of a marathon runner
30. all of the above
34. all of the above
35. a cytoskeleton
38. cytoskeleton
40. microfilaments
41. plasmodesmata