Multiple-Choice Questions

1) Which of the following statements about cells is true?
   A) All cells have cell walls.
   B) All cells have internal structures that move.
   C) All cells are attached to other cells.
   D) All cells are motile.
   E) All cells have static organelles.

   Answer: B
   Topic: Opening Essay
   Skill: Factual Recall

2) Light microscopes
   A) can generally magnify objects about 10,000 times without blurring.
   B) typically provide more resolution than an electron microscope.
   C) work by reflecting electrons off the surface of an object being studied.
   D) use light and glass lenses to magnify an image.
   E) are generally not used to view bacteria.

   Answer: D
   Topic: 4.1
   Skill: Factual Recall

3) One centimeter = ________ millimeters.
   A) 0.01
   B) 0.10
   C) 10
   D) 100
   E) 1,000

   Answer: C
   Topic: 4.1
   Skill: Factual Recall

4) Resolution is the
   A) ability of an optical instrument to show two close objects as separate.
   B) size of an image.
   C) ability of an optical instrument to magnify an image.
   D) ability of an optical instrument to estimate the size of an image.
   E) distance between the lenses of a microscope.

   Answer: A
   Topic: 4.1
   Skill: Factual Recall

5) Which of the following statements about electron microscopes is true?
   A) Electron microscopes focus electron beams to create a magnified image of an object.
   B) Scanning electron microscopes are used to study the details of internal cell structure.
   C) Electron microscopes use glass lenses to focus and magnify the image.
D) Transmission electron microscopes are mainly used to study cell surfaces.
E) Specimens must be sectioned to be viewed under a scanning electron microscope.

Answer: A

Topic: 4.1
Skill: Factual Recall

6) A scientist wants to examine living cells lining the respiratory tract to determine how the cells use tiny hairs to move dirt and mucus away from the lungs. Which of the following instruments would be best, and why?
A) a light microscope, because it allows observations of whole, live cells
B) a transmission electron microscope, because it has high resolution
C) a transmission electron microscope, because it is capable of very high magnification
D) a scanning electron microscope, because it can reveal structures on cell surfaces
E) a scanning electron microscope, because it can be used to observe whole cells without slicing them

Answer: A

Topic: 4.1
Skill: Application

7) The idea that all living things are composed of cells and that all cells come from other cells defines
A) central dogma.
B) the laws of inheritance.
C) organelle theory.
D) cell theory.
E) inheritance of acquired characteristics.

Answer: D

Topic: 4.1
Skill: Factual Recall

8) A scientist wants to magnify a pollen grain 8,000 times and examine the ridges and pores on its surface. Which one of the following instruments would be best?
A) a transmission electron microscope
B) a scanning electron microscope
C) a fluorescence confocal microscope
D) a differential interference-contrast microscope
E) an inverted light microscope

Answer: B

Topic: 4.1
Skill: Application

9) A scanning electron microscope is used to study ________, whereas a transmission electron microscope is used to study ________.
A) live cells . . . dead cells
B) cell surfaces . . . internal cell structures
C) dead cells . . . live cells
D) internal cell structures . . . cell surfaces
E) plant tissue . . . animal tissue

Answer: B

Topic: 4.1
Skill: Factual Recall

10) The diameter of most animal and plant cells ranges from
A) 0.01 to 0.1 micrometers.
B) 0.1 to 1.0 micrometers.
C) 1.0 to 10 micrometers.
D) 10 to 100 micrometers.
E) 100 to 1000 micrometers.

Answer: D
Topic: 4.2
Skill: Factual Recall

11) As cell size increases, the
A) volume and surface area decrease.
B) volume increases faster than the surface area.
C) surface area increases faster than the volume.
D) surface area and volume increase at the same rate.
E) surface area decreases while the volume remains constant.

Answer: B
Topic: 4.2
Skill: Conceptual Understanding

12) Which of the following cells has the greatest surface-to-volume ratio?
A) bacterium
B) human red blood cell
C) human muscle cell
D) frog egg
E) ostrich egg

Answer: A
Topic: 4.2
Skill: Conceptual Understanding

13) A cell is exposed to a substance that prevents it from dividing. The cell becomes larger and larger. This situation
A) should present no problem to the cell, since it can continue to perform all other necessary functions.
B) should present no problem to the cell, because the surface area of the cell will increase as the volume of the cell increases.
C) will eventually be problematic, since the cell's ability to absorb nutrients through its outer membrane will not keep increasing as quickly as its cytoplasmic needs.
D) should be beneficial, since the cell will be able to divert the ATP normally used for cell division to other processes.
E) will eventually lead to the cell's deterioration, since functional organelles will not proportionally increase with the size of the cell.

Answer: C
Topic: 4.2
Skill: Conceptual Understanding

14) Your throat is dry, and you want the last cough drop in the box to last a long time in your mouth. What should you do?
A) Break the cough drop into little pieces and put them all in your mouth. Since each little piece must be dissolved separately, the drop will last longer.
B) Keep the cough drop whole. This maintains the largest surface-to-volume ratio, and slows the dissolution of the cough drop.
C) Break the cough drop into little pieces and put them all in your mouth. This decreases the surface-to-volume ratio, and slows the dissolution of the cough drop.
D) It doesn't matter if the cough drop is in one piece or many pieces; the total amount of cough drop is all that matters.
E) Break the cough drop into little pieces, put them all in your mouth, and drink plenty of water.

Answer: B
Topic: 4.2
Skill: Conceptual Understanding

15) Archaea are composed of ________ cells.
A) plant
B) prokaryotic
C) bacterial
D) eukaryotic
E) animal

Answer: B
Topic: 4.3
Skill: Application

16) Which of the following structures is exclusively associated with prokaryotic cells?
A) a membrane-bound nucleus
B) nucleoid
C) a cell wall
D) membrane-enclosed organelles
E) ribosomes

Answer: B
Topic: 4.3
Skill: Factual Recall

17) The nucleoid region of a prokaryotic cell
A) contains the cell's DNA.
B) separates the RNA from the cytoplasm.
C) is surrounded by a nucleoid membrane.
D) contains the cell's nucleoli.
E) is the site of organelle production.

Answer: A
Topic: 4.3
Skill: Factual Recall

18) ________ cells lack a membrane-enclosed nucleus.
A) Plant
B) Animal
C) Prokaryotic
D) Eukaryotic
E) Fungal

Answer: C
Topic: 4.3
Skill: Factual Recall

19) A bacterial cell's DNA is found in its
A) ribosomes.
B) nucleus.
C) peroxisome.
D) nucleoid region.
E) capsule.

Answer: D
Topic: 4.3
Skill: Factual Recall

20) Which of the following structures are used by prokaryotes for attaching to surfaces?
A) pili
B) flagella
C) capsules  
D) anchoring junctions  
E) both pili and capsules  

Answer: E  
**Topic:** 4.3  
**Skill:** Factual Recall  

21) The membranous compartmentalization of a cell  
A) divides the cell into two equal-sized halves.  
B) allows different metabolic processes to occur simultaneously.  
C) requires the presence of a cell wall.  
D) requires the presence of a large central vacuole.  
E) is common in prokaryotes and eukaryotes.  

Answer: B  
**Topic:** 4.4  
**Skill:** Factual Recall  

22) Which of the following statements about internal membranes in eukaryotic cells is *false*?  
A) In eukaryotic cells, internal membranes greatly increase a cell's total membrane area.  
B) In eukaryotic cells, internal membranes provide an additional area for many metabolic processes occur.  
C) In eukaryotic cells, internal membranes form membranous compartments called organelles.  
D) In eukaryotic cells, internal membranes contain proteins essential for metabolic processes.  
E) In eukaryotic cells, internal membranes standardize the internal environment of all cellular organelles.  

Answer: E  
**Topic:** 4.4  
**Skill:** Factual Recall  

23) You are told that the cells on a microscope slide are plant, animal, or bacterial. You look at them through a microscope and see cell walls and membrane-bound organelles. You conclude correctly that the cells  
A) are plant cells.  
B) are animal cells.  
C) are bacterial cells.  
D) could be either plant or bacterial cells.  
E) could be plant, animal, or bacterial cells.  

Answer: A  
**Topic:** 4.4  
**Skill:** Conceptual Understanding  

24) Unlike animal cells, plant cells have _________ and _________. Unlike plant cells, animal cells have _________.  
A) chloroplasts . . . cell walls . . . centrioles  
B) centrioles . . . chloroplasts . . . cell walls  
C) chloroplasts . . . cell walls . . . cell membranes  
D) chloroplasts . . . cell walls . . . a nucleus  
E) centrioles . . . cell walls . . . large central vacuoles  

Answer: A  
**Topic:** 4.4  
**Skill:** Factual Recall  

25) Which of the following statements about cellular metabolism is *false*?  
A) Cellular metabolism includes different processes that require different conditions.  
B) Cellular metabolism can occur within organelles.  
C) Cellular metabolism can involve the synthesis of steroid hormones.  

Answer: C
D) Cellular metabolism occurs in animal but not plant cells.
E) Cellular metabolism often occurs on the surfaces of internal membranes.

Answer: D
Topic: 4.4
Skill: Factual Recall

26) Plasma membranes are permeable to
A) large molecules such as starch.
B) large molecules such as proteins.
C) small ions such as Na+.
D) nonpolar molecules such as CO2.
E) hydrophilic molecules such as glucose.

Answer: D
Topic: 4.5
Skill: Factual Recall

27) What would you expect to find when looking through a SEM at a cell treated with an enzyme that cleaves proteins at their hydrophilic amino acids?
A) a cell surface that is devoid of any major structures
B) a cell surface covered with polysaccharides
C) a cell surface coated with hydrophilic proteins
D) a cell surface coated with lipids and polysaccharides
E) a cell surface without its outer phospholipid bilayer

Answer: A
Topic: 4.5
Skill: Conceptual Understanding

28) The nucleus of a cell
A) is surrounded by a single layer of membrane.
B) is contained within the nucleolus.
C) is the region of the cell where ribosomes are degraded.
D) contains DNA.
E) is the primary location of protein synthesis.

Answer: D
Topic: 4.6
Skill: Factual Recall

29) Long fibers of DNA and protein are called
A) chromatin.
B) a nucleolus.
C) a ribosome.
D) a lysosome.
E) a central vacuole.

Answer: A
Topic: 4.6
Skill: Factual Recall

30) During cell reproduction, chromatin fibers coil up into structures called
A) ribosomes.
B) lysosomes.
C) peroxisomes.
D) chromosomes.
E) nucleoli.
31) The function of the nucleolus is
A) to manufacture polypeptides.
B) to manufacture ribosomal RNA.
C) intracellular digestion.
D) to store chromatin.
E) to produce H$_2$O$_2$.

Answer: B
Topic: 4.6
Skill: Factual Recall

32) Protein synthesis requires the use of mRNA, which
A) is made in the nucleolus.
B) directs the degradation of DNA.
C) must be made by the ribosomes.
D) is translated by the ribosomes into the amino acid sequences of proteins.
E) carries the message to the nucleus to synthesize new DNA during cell division.

Answer: D
Topic: 4.6
Skill: Factual Recall

33) The plasma cell produces thousands of antibodies per second. What type of intracellular structure would you expect to be very prominent within the cell?
A) nucleus
B) endoplasmic reticulum
C) mitochondria
D) peroxisome
E) microtubules

Answer: B
Topic: 4.7
Skill: Conceptual Understanding

34) Which location in the cell is unlikely to contain ribosomes or ribosomal subunits?
A) nuclear envelope
B) nucleolus
C) plasma membrane
D) endoplasmic reticulum
E) cytoplasm

Answer: C
Topic: 4.7
Skill: Factual Recall

35) Which of the following statements regarding the endomembrane system is false?
A) The endomembrane system is involved in the synthesis, storage, and export of important molecules.
B) The endomembrane system includes the rough and smooth endoplasmic reticulum.
C) The endomembrane system includes the nuclear envelope.
D) The endomembrane system is a system of interrelated membranes that are all physically connected.
E) The endomembrane system divides the cell into compartments.
36) The endomembrane system includes all of the following organelles except the
A) plasma membrane.
B) endoplasmic reticulum.
C) peroxisome.
D) Golgi apparatus.
E) lysosome.

Answer: C
Topic: 4.8
Skill: Factual Recall

37) Smooth endoplasmic reticulum
A) stores calcium ions in muscle cells.
B) is the major site of carbohydrate synthesis in eukaryotic cells.
C) produces proteins for cell membranes.
D) produces antibodies.
E) helps assemble ribosomes for protein synthesis.

Answer: A
Topic: 4.9
Skill: Factual Recall

38) The two main functions of the rough endoplasmic reticulum are the production of
A) mitochondria and proteins secreted by the cell.
B) hydrogen peroxide and steroid hormones secreted by the cell.
C) ribosomes and steroid hormones.
D) membrane and proteins secreted by the cell.
E) chromatin and mitochondria.

Answer: D
Topic: 4.9
Skill: Factual Recall

39) Secretory proteins are
A) produced by ribosomes on the smooth endoplasmic reticulum.
B) chemically modified in the nucleus.
C) produced by the cell for internal use.
D) released from the cell through the plasma membrane.
E) incorporated into the mitochondrial membrane.

Answer: D
Topic: 4.9
Skill: Factual Recall

40) The cells that produce hair contain a lot of _______, while the cells that produce the oils that coat the hair contain a lot of ________.
A) smooth endoplasmic reticulum . . . lysosomes
B) rough endoplasmic reticulum . . . smooth endoplasmic reticulum
C) smooth endoplasmic reticulum . . . rough endoplasmic reticulum
D) microbodies . . . lysosomes
E) nuclei . . . chromatin
41) The Golgi apparatus
A) is composed of stacks of membranous vesicles that are continuous with one another.  
B) stores, modifies, and packages proteins.  
C) strings together amino acids to produce proteins.  
D) forms fats from glycerols and fatty acids.  
E) is the site of carbohydrate breakdown.
Answer: B

Topic: 4.9  
Skill: Conceptual Understanding

42) Which of the following statements regarding the Golgi apparatus is false?  
A) The Golgi apparatus works closely with the endoplasmic reticulum.  
B) The Golgi apparatus serves as a molecular warehouse and finishing factory.  
C) The Golgi apparatus decreases in size when a cell increases its protein production.  
D) The Golgi apparatus modifies chemicals received from the endoplasmic reticulum.  
E) The Golgi apparatus sorts molecules according to their destination.
Answer: C

Topic: 4.10  
Skill: Factual Recall

43) Which of the following statements about lysosomes is false?  
A) Lysosomes help to digest worn-out or damaged organelles.  
B) Lysosomes synthesize proteins from the recycled amino acids.  
C) Lysosomes fuse with food vacuoles to expose nutrients to lysosomal enzymes.  
D) Lysosomes destroy harmful bacteria engulfed by white blood cells.  
E) Lysosomes recycle materials within the cell.
Answer: B

Topic: 4.11  
Skill: Factual Recall

44) When a cell is deprived of oxygen, its lysosomes tend to burst and release their contents into the cell. As a result of this, that cell will  
A) recycle damaged organelles.  
B) produce additional ER.  
C) undergo cell division.  
D) produce replacement lysosomes.  
E) undergo self-digestion and die.
Answer: E

Topic: 4.11  
Skill: Conceptual Understanding

45) Tay-Sachs disease results from the malfunction of  
A) mitochondria.  
B) lysosomes.  
C) endoplasmic reticulum.  
D) chloroplasts.  
E) nucleoli.
Answer: B
46) Tay-Sachs disease
A) causes an accumulation of lipids in brain cells.
B) involves damage to liver cells.
C) is due to the absence of an enzyme that digests polysaccharides.
D) prevents the breakdown of glycogen.
E) results in an accumulation of triglycerides in the alveoli of the lungs.

Answer: A

47) Which of the following statements about the functions of a plant cell central vacuole is false?
A) The central vacuole of a plant cell may help increase the size of cells by absorbing water.
B) The central vacuole of a plant cell may store pigments that will help attract pollinating insects.
C) The central vacuole of a plant cell may store waste products.
D) The central vacuole of a plant cell may digest chemicals for recycling.
E) The central vacuole of a plant cell may store poisons.

Answer: D

48) Contractile vacuoles
A) are generally found in protists that inhabit salt water.
B) help in the excretion of excess salt.
C) prevent cells from bursting as a result of the influx of excess water.
D) allow organisms to avoid dehydration by absorbing water from the environment.
E) stimulate the absorption of salt water.

Answer: C

49) A manufacturing company dumps its wastes into a nearby pond. One of the wastes is found to paralyze the contractile vacuoles of certain protists. A biologist looking at individual samples of these organisms taken from the pond would find that they
A) have lost water and shrunk.
B) have gained water and burst.
C) have died of malnutrition.
D) have died because wastes have built up in the cytoplasm.
E) are surviving but are unable to reproduce.

Answer: B

50) Which organelle is involved in the catabolism of fatty acids and the detoxification of alcohol?
A) peroxosome
B) Golgi apparatus
C) smooth ER
D) nucleus
E) ribosomes
51) Insulin is a protein that is produced by pancreatic cells and secreted into the bloodstream. Which of the following options correctly lists the order of the structures through which insulin passes from its production to its exit from the cell?
A) rough ER, transport vesicles, Golgi apparatus, transport vesicles, cell membrane
B) rough ER, lysosomes, transport vesicles, cell membrane
C) rough ER, Golgi apparatus, smooth ER, cell membrane
D) rough ER, transport vesicles, cell membrane
E) rough ER, transport vesicles, Golgi apparatus, vacuole, cell membrane

Answer: A
Topic: 4.13
Skill: Factual Recall

52) The function of mitochondria is
A) cellular respiration.
B) intracellular transport of proteins.
C) lipid synthesis.
D) photosynthesis.
E) intracellular digestion.

Answer: A
Topic: 4.14
Skill: Conceptual Understanding

53) Cyanide inhibits mitochondrial function; as a result, the rate of
A) ATP synthesis increases.
B) ATP synthesis decreases.
C) photosynthesis increases.
D) lipid synthesis increases.
E) protein synthesis increases.

Answer: B
Topic: 4.14
Skill: Application

54) The ________ of a mitochondrion is/are an adaptation that increases the surface area and enhances a mitochondrion’s ability to produce ATP.
A) stroma
B) grana
C) intermembrane space
D) cristae
E) matrix

Answer: D
Topic: 4.14
Skill: Factual Recall

55) The function of chloroplasts is
A) cellular respiration.
B) intracellular transport of proteins.
C) lipid synthesis.
D) photosynthesis.
E) intracellular digestion.
56) The stroma is the
A) thick fluid enclosed by the inner chloroplast membrane.
B) watery fluid enclosed by the inner membrane of a mitochondrion.
C) space between the inner and outer membranes of a chloroplast.
D) space between the inner and outer membranes of a mitochondrion.
E) fluid within the grana.

Answer: A
Topic: 4.15
Skill: Factual Recall

57) Mitochondria differ from chloroplasts in that mitochondria
A) convert solar energy to chemical energy, whereas chloroplasts convert one form of chemical energy to another.
B) contain three different membrane-bound compartments, whereas chloroplasts contain two.
C) contain membrane folds called cristae, whereas chloroplasts contain disk-like vesicles in stacks called grana.
D) are not found in plants, whereas chloroplasts are not found in animals.
E) produce glucose, whereas chloroplasts break glucose down.

Answer: C
Topic: 4.14, 4.15
Skill: Factual Recall

58) The endosymbiosis hypothesis proposes that
A) two cells were juxtaposed and one benefited from the other.
B) one cell was dependent on the other for survival.
C) a small cell lived inside a larger cell to the benefit of both cells.
D) a large cell engulfed and digested a smaller cell, exposing its enzymes for use by the larger cell.
E) two cells merged into one cell, improving the enzyme function of the new cell.

Answer: C
Topic: 4.16-Evolution Connection
Skill: Factual Recall

59) The endosymbiosis hypothesis is supported by all of the following pieces of evidence, except the fact that
A) mitochondria have circular DNA like prokaryotes.
B) mitochondria synthesize glucose like prokaryotes.
C) chloroplasts have ribosomes like prokaryotes.
D) mitochondria have a double membrane.
E) chloroplasts split like prokaryotes.

Answer: B
Topic: 4.16-Evolution Connection
Skill: Factual Recall

60) Microfilaments differ from microtubules in that microfilaments
A) are larger than microtubules.
B) are found only in plants, whereas microtubules are found in plants and animal cells.
C) are mainly composed of actin, whereas microtubules are composed of tubulin.
D) help to anchor organelles, whereas microtubules primarily function to help cells change shape and move.
E) form the inner core of cilia and flagella, whereas microtubules regulate metabolism.

Answer: C
61) Which of the following statements about the cytoskeleton is false?
A) The cytoskeleton helps to support cells.
B) Once laid down, the elements of the cytoskeleton are fixed and remain permanently in place.
C) The cytoskeleton is composed of three types of fibers: microfilaments, microtubules, and intermediate filaments.
D) The cytoskeleton plays an important role in amoeboid motion.
E) The cytoskeleton includes fibrous and globular proteins.

Answer: B

62) Intermediate filaments
A) guide the movements of chromosomes.
B) are found within cilia and flagella.
C) surround the nucleus.
D) guide the movements of organelles.
E) support the inner mitochondrial membrane.

Answer: C

63) A drug that interferes with microtubule formation is likely to completely disrupt
A) the production of ribosomes.
B) the amoeboid motion of a cell.
C) the function of lysosomes.
D) contraction of muscle cells.
E) the movements of sperm cells.

Answer: E

64) Cilia differ from flagella in that
A) cilia are composed of microfilaments and flagella are composed of intermediate filaments.
B) cilia contain nine microtubule doublets surrounding a central pair of microtubules, while flagella contain only nine microtubule doublets.
C) the protein filaments of cilia are "naked," while those of flagella are wrapped in an extension of the cell membrane.
D) cilia are typically more numerous and shorter than flagella.
E) cilia are anchored only in the proteins of the cell membrane, while flagella are anchored in a special structure called the basal body.

Answer: D

65) A basal body is
A) composed of nine microtubule triplets surrounding a central pair of microtubules.
B) similar in structure to centrioles.
C) composed of nine microtubule doublets surrounding a central pair of microtubules.
D) identical in structure to cilia.
E) identical in structure to flagella.

Answer: B
66) Dynein arms
A) are present in cilia but not in flagella.
B) are knobs of carbohydrate that are essential to the movement of cilia and flagella.
C) are found on microtubules in cilia and flagella and cause movement by grabbing and pulling at adjacent microtubule doublets.
D) are the anchoring proteins in basal bodies.
E) join microfilaments to the cell membrane.
Answer: C

67) A woman is having trouble becoming pregnant. Examination of her partner's sperm indicates that dynein arms are missing from the flagella in his sperm cells. A physician explains that this could interfere with fertility by
A) preventing the sperm from attaching to the egg cell.
B) preventing the sperm from swimming to the egg cell.
C) preventing the sperm from producing enough energy to power swimming.
D) interfering with the attachment of the flagella to the sperm.
E) interfering with the ability of the sperm to tolerate the acid conditions in the vaginal canal.
Answer: B

68) Decreased fertility in men from developed countries may be related to
A) increased exposure to hormone-like chemicals in the environment.
B) decreased flagella motion due to inactivity.
C) increased sperm motility from multiple flagella.
D) decreased metabolic levels from overexposure to UV rays.
E) decreased ATP synthesis from low glucose levels.
Answer: A

69) Most animal cells are
A) surrounded by a cell wall.
B) attached to each other via plasmodesmata.
C) embedded in an endomembrane system.
D) embedded in an extracellular matrix.
E) embedded in a lipid matrix.
Answer: D

70) Most cells from multicellular organisms must be attached to their surroundings via integrins. Failure to maintain this contact will usually result in
A) the proliferation of the cell.
B) increased metabolic activity of the cell.
C) the death of the cell.
D) increased communication with other cells.
E) improved autocrine functions.
Answer: C
71) Which of the following would be most affected by a mutation that prevented cells from forming tight junctions?
A) attachment of cells to the surrounding matrix
B) direct flow of water and small molecules from one cell to another
C) integrity of the inner lining of the digestive tract
D) attachment of the cytoskeleton to the inside of the plasma membrane
E) attachment of the cell wall of one plant cell to the cell wall of another

Answer: C

72) Skin cells are attached to the extracellular matrix by
A) basal bodies.
B) anchoring junctions.
C) tight junctions.
D) communicating junctions.
E) plasmodesmata.

Answer: B

73) It is essential for heart muscle cells to beat in a coordinated fashion. The cell junctions that would best facilitate this are
A) occluding junctions.
B) anchoring junctions.
C) tight junctions.
D) communicating junctions.
E) plasmodesmata.

Answer: D

74) Which of the following statements about plant cell walls is false?
A) Plant cell walls consist of cellulose fibers embedded in a matrix of polysaccharides and proteins.
B) The cell wall of one plant cell is separated from the cell wall of another by a layer of sticky polysaccharides.
C) Plant cell walls are multilayered structures.
D) Plant cell walls protect plant cells by forming an impermeable layer around the cell.
E) Wood is primarily composed of plant cell walls.

Answer: D

75) Which of the following statements regarding plasmodesmata is false?
A) Plasmodesmata penetrate plant cell walls.
B) Plasmodesmata are one type of cell junction in plants.
C) Plasmodesmata carry chemical messages between plant cells.
D) Plasmodesmata carry nutrients between plant cells.
E) Plasmodesmata are commonly found in single-celled organisms.

Answer: E
76) Which of the following cell structures is associated with the breakdown of harmful substances or substances that are no longer needed by the cell?
A) chloroplasts
B) mitochondria
C) peroxisomes
D) ribosomes
E) centrioles

Answer: C
Topic: 4.23
Skill: Factual Recall

77) Which of the following statements regarding cells is false?
A) All cells are enclosed in a membrane that maintains internal conditions different from the surroundings.
B) All cells have a cell wall.
C) All cells can interconvert forms of energy.
D) All cells can interconvert chemical materials.
E) All cells have DNA as their genetic material.

Answer: B
Topic: 4.23
Skill: Factual Recall

78) A child dies following a series of chronic bacterial infections. At the autopsy, the physicians are startled to see that the child's white blood cells are loaded with vacuoles containing intact bacteria. Which of the following explanations could account for this finding?
A) A defect in the Golgi apparatus prevented the cells from processing and excreting the bacteria.
B) A defect in the rough endoplasmic reticulum prevented the synthesis of the antibodies (defensive proteins) that would have inactivated the bacteria.
C) A defect in the cell walls of the white blood cells permitted bacteria to enter the cells.
D) A defect in the lysosomes of the white blood cells prevented the cells from destroying engulfed bacteria.
E) A defect in the surface receptors of the white blood cells permitted bacteria to enter the cells.

Answer: D
Topic: 4.23
Skill: Application
Art Questions

1) According to this figure, which of the following is large enough to see in the light microscope?
A) atoms  
B) proteins  
C) ribosome  
D) viruses  
E) mitochondria

Answer: E

Topic: 4.2  
Skill: Application

2)
Which part of the mitochondrion shown is its matrix?
A) structure A
B) structure B
C) structure C
D) structure D
E) structure E
Answer: E

Topic: 4.14
Skill: Factual Recall

Scenario Questions

After reading the following paragraph, answer the question(s) below.

The skin is the body's largest organ. It's made up of many different types of cells. Oils, produced by the sebaceous glands, prevent the skin from drying and splitting. The protein melanin, produced by melanocytes in the epidermis, protects the skin from the harmful effects of ultraviolet radiation. Sweat, released through ducts to the skin surface, helps to cool the body. The types of cells that produce these compounds have different numbers of specific organelles, depending on their function.

1) Based on their function, you would expect melanocytes in the skin to have a higher than usual number of
A) lysosomes.
B) chloroplasts.
C) ribosomes.
D) Golgi bodies.
E) microtubules.
Answer: A

Topic: 4.7, 4.9
Skill: Conceptual Understanding

2) The oil from the sebaceous glands is produced by which of the following cell organelles?
A) ribosomes
B) rough endoplasmic reticulum
C) cell membrane
D) smooth endoplasmic reticulum
E) central vacuole
Answer: D
Topic: 4.9
Skill: Factual Recall