Biology Standard 1 (BiologyStandard1)

Name:_____ Date:_____

1.

A red blood cell was placed in a concentrated salt water solution. It would be expected to

A. shrink.
B. swell.
C. divide.
D. grow.

2. Photosynthesis is BEST represented by which of the following?

A. $6H_20 + 6C0_2 \rightarrow C_6H_{12}O_6 + 6O_2$

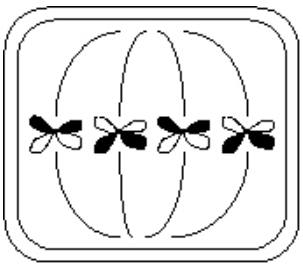
B. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_20$

C. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2 + 3O_2$

D. $6COOH + 3H_20 + 3O_3 \rightarrow C_6H_{12}O_6 + 6O_2$

3. Which of the following is released when ATP is converted to ADP and inorganic phosphate?

A. energy
B. oxygen
C. tannic acid
D. dihydrogen phosphate

4. 

The plant cell shown above is in which phase of mitosis?

A. anaphase

B. interphase

C. prophase

D. metaphase

5. A human skin cell contains 46 chromosomes. After the cell completes the process of mitosis and the cell divides, how many chromosomes will each of the new skin cells contain?

A. 2
B. 23
C. 46
D. 92

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6. Passive transport differs from active transport in that passive transport

A. uses ATP from the cell's mitochondria.
B. requires twice as much energy to take place.
C. uses energy from the cell's energy reserves.
D. does not require energy from ATP to take place.

7.

After eating a large meal, the glucose concentration in the blood increases. When this happens, insulin is released to help transport the excess glucose out of the blood and into specific tissues. The blood glucose concentrations then return to normal. This process is an example of

A. respiration.
B. homeostasis.
C. metaphase.
D. immune response.

8.

Different types of environments present different types of problems involving osmotic regulation for the organisms that live there. Which of the following marine environments provides the **most** stable osmotic environment?

A. deep-sea waters because solutes remain at a fairly constant level
B. polar waters because they maintain a nearly constant temperature
C. surface waters because they receive more incoming solar radiation
D. coastal ocean waters because they receive a great deal of fresh water

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9.

Carbohydrates are used by the body as a source of quick energy, and are made up of

A. carbon, hydrogen, and oxygen.
B. oxygen, hydrogen, and protein.
C. potassium, oxygen, and carbon.
D. hydrogen, cholesterol, and oxygen.

10.

Energy produced by cellular processes, such as photosynthesis and respiration, is stored by

A. ATP.
B. ARP.
C. DNA.
D. RNA.

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11. ATP molecules store energy for cellular activity. When the bond holding the third phosphate is broken,

A. all cellular activity stops.
B. energy is released and changes ATP to ADP.
C. energy dissipates and metabolic functions increase.
D. tRNA picks up the phosphate for protein synthesis.

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12. Two bacterial daughter cells of about the same size with identical DNA may be formed by the process of

A. budding.
B. meiosis.
C. binary fission.
D. vegetative propagation.

13.

Which of the following statements regarding cells is true?

A. All types of cells have the same life span.
B. The size of each type of cell varies greatly.
C. Most cells are unable to reproduce independently.
D. In humans, each tissue is composed of multiple cell types.

14.

In simple diffusion and passive transport,

A. the cell must expend energy.
B. enzymes are required to initiate the process.
C. movement occurs against the concentration gradient.
D. the process occurs naturally and requires no energy.

15.

A red blood cell is placed in a 0.9% salt solution. If the cell remains at equilibrium, neither gaining nor losing water, the solution is

A. isotonic.
B. hypotonic.
C. hypertonic.
D. hydrostatic.

16. In mitosis, interphase is the period when the cell begins preparations to divide. Which of the sequences below follows interphase?

A. prophase → metaphase → anaphase → telophase
B. metaphase → prophase → telophase → anaphase
C. anaphase → telophase → interphase → anaphase
D. telophase → anaphase → metaphase → prophase

17.

An animal cell containing 32 chromosomes divides by mitosis. Each of the resulting daughter cells goes through mitosis. The cells that result each have

A. 4 chromosomes.
B. 8 chromosomes.
C. 16 chromosomes.
D. 32 chromosomes.

18. What is the final outcome of mitosis?

A. Reproductive cells called gametes are produced.
B. Two gametes unite to form a zygote.
C. Chromosomes are paired.
D. Nuclear material in the cell divides equally.

19.

A cell stores food or waste products in

A. chloroplasts.
B. nuclei.
C. ribosomes.
D. vacuoles.

20. Which part of the cell provides energy through the process of cellular respiration?

A. cell wall
B. cytoplasm
C. mitochondrion
D. cell membrane

21.

All cells must have a

A. cell membrane.
B. cell wall.
C. nucleus.
D. nucleoli.

22.

Which of the following are **most likely** to be found in all unicellular and multicellular organisms?

A. nervous systems
B. nucleic acids
C. chloroplasts
D. organs

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23. Which are examples of asexual reproduction? I. binary fission II. fertilization III. budding

A. I and II only
B. I and III only
C. II and III only
D. I, II, and III

24.

Osmosis is an example of

A. cytolysis.
B. active transport.
C. passive transport.
D. a chemical change.

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25. Which is the primary energy source for **most** animals?

A. carbohydrates
B. proteins
C. fiber
D. fats

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26. Approximately 20 amino acids are essential to living systems. How are amino acids linked together to form proteins?

A. genetic bonds
B. peptide bonds
C. acid-base bonds
D. hydrogen bonds

27.

Which organelle is a membrane-bound sac which stores nutrients within the cell?

A. endoplasmic reticulum
B. Golgi complex
C. nucleus
D. vacuole

28.

Which statement describes passive transport?

A. Substances harmful to a cell are excreted.
B. Large molecules move across a membrane.
C. A foreign organism transports substances it needs into the cell.
D. A substance moves across a membrane without using cellular energy.

29.

Why is mitosis important in multicellular organisms?

A. Mitosis is essential to cell replication, tissue development, and maintenance of cell size.
B. Mitosis ensures that diploid reproductive cells divide twice, forming four haploid daughter cells.
C. Mitosis is responsible for passing on genetic variability and beneficial mutations to the next generation.
D. Mitosis allows tissue growth in multicellular organisms by resulting in the formation of gametes, which then form new cells.

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30. Which of the following examples illustrates osmosis?

A. Water leaves the tubules of the kidney in response to the hypertonic fluid surrounding the tubules.
B. Digestive enzymes are excreted into the small intestine.
C. White blood cells consume pathogens and cell debris at the site of an infection.
D. Calcium is pumped inside a muscle cell after the muscle completes its contraction.

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31. **Cells use passive and active transport to move materials across cell membranes in order to maintain a constant internal environment. What is the process of maintaining a constant internal environment called?**

A. diffusion

B. evolution

C. homeostasis

D. respiration

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32. **A type of cell that can exist in a broad range of environmental conditions, can rapidly multiply, and lacks a nucleus is known as what type of cell?**

A. animal

B. eukaryotic

C. plant

D. prokaryotic

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33. **Unlike prokaryotic cells, eukaryotic cells have the capacity to**

A. assemble into multicellular organisms

B. establish symbiotic relationships with other organisms

C. obtain energy from the Sun

D. store genetic information in the form of DNA

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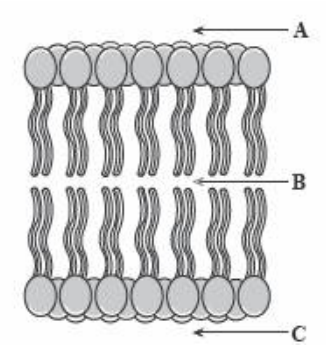
34. **As illustrated below, the molecules of many membranes are arranged with their polar heads to the outside and their nonpolar tails to the inside.**



With this arrangement, where would you MOST likely find water molecules?

A. A only

B. B only

C. C only

D. A and C

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35. **If placed in a hypertonic solution, a plant cell will**

A. swell

B. burst

C. shrink in size

D. remain constant in size

---

36. Some cells, such as human nerve and muscle cells, contain many more mitochondria than do other cells, such as skin cells. Why do some cells have more mitochondria than others?

A. The cells use more energy.

B. The cells store more nutrients.

C. The cells degrade more proteins.

D. The cells divide more frequently.

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37. A single prokaryotic cell can divide several times in an hour. Few eukaryotic cells can divide as quickly. Which of the following statements **best** explains this difference?

A. Eukaryotic cells are smaller than prokaryotic cells.

B. Eukaryotic cells have less DNA than prokaryotic cells.

C. Eukaryotic cells have more cell walls than prokaryotic cells.

D. Eukaryotic cells are more structurally complex than prokaryotic cells.

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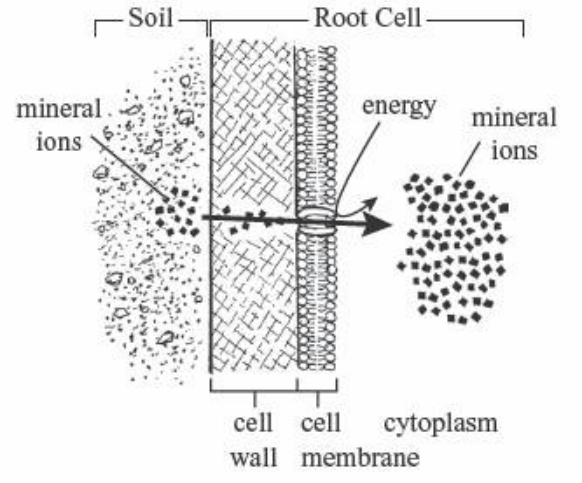
38. The diagram below illustrates how plant root cells take in mineral ions from the surrounding soil.



Which of the following processes is illustrated?

A. active transport

B. diffusion

C. osmosis

D. passive filtration

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39. Human tears contain the enzyme lysozyme, which damages the cell walls of bacteria. Which of the following statements about lysozyme is **most** accurate?

A. Lysozyme causes mutations in bacterial cell wall molecules.

B. Lysozyme is destroyed as it digests bacterial cell wall molecules.

C. Lysozyme breaks a specific type of bond in a bacterial cell wall molecule.

D. Lysozyme is converted to another chemical by a bacterial cell wall molecule.

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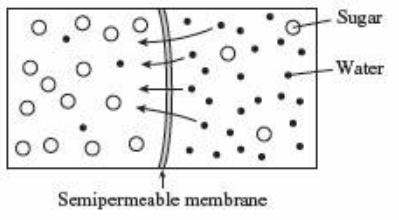
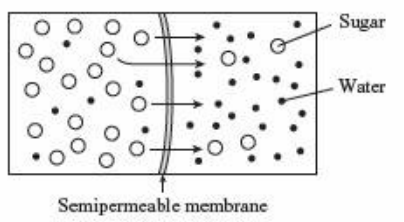
40. Which of the diagrams below **best** represents the net movement of molecules in osmosis?

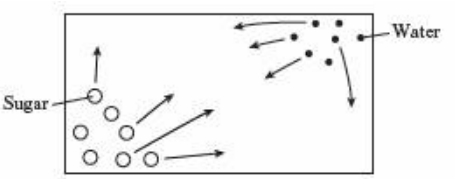
A.



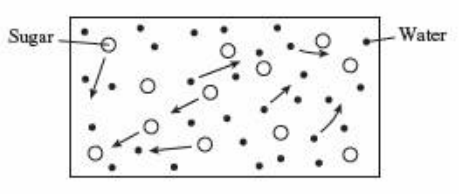
B.



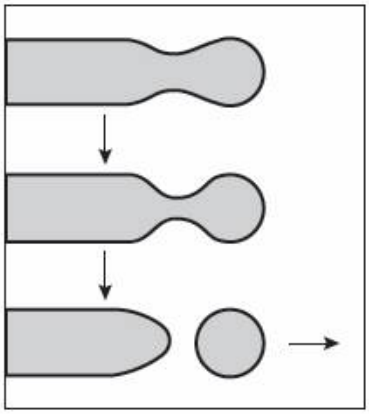
C.



D.



41. A cross section of part of a Golgi complex is shown below.



Part of the membrane of the Golgi complex pinches off and moves away. Which of the following is a function of this process?

A. to release energy from ATP

B. to deliver proteins to other locations in the cell

C. to collect amino acids for use in protein synthesis

D. to send messages about cell requirements to the nucleus

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42.

A major function of the cell membrane in eukaryotes is to

A. produce the energy for the cell.
B. digest nutrients and remove waste.
C. regulate the production of proteins.
D. hold the cytoplasm and other organelles into shape.

43.

Which class of biomolecule includes monosaccharides such as the blood sugar glucose, and the fruit sugar, fructose, which is found in energy drinks?

A. carbohydrates
B. lipids
C. nucleic acids
D. proteins

44.

Which statement about the function enzymes in living systems is MOST accurate?

A. Enzymes are proteins that raise the activation energy for chemical reactions.
B. Enzymes are proteins that lower the activation energy for chemical reactions.
C. Enzymes are nucleic acids that raise the activation energy of chemical reactions.
D. Enzymes are nucleic acids that lower the activation energy of chemical reactions.

45.

Grizzly bears, such as the ones shown, gain 200 to 500 pounds of fat every summer, feasting on salmon, berries, and honey. In winter, almost all of this stored weight is lost during hibernation. What type of stored biomolecules allow the grizzly to hibernate this way, without starving to death?

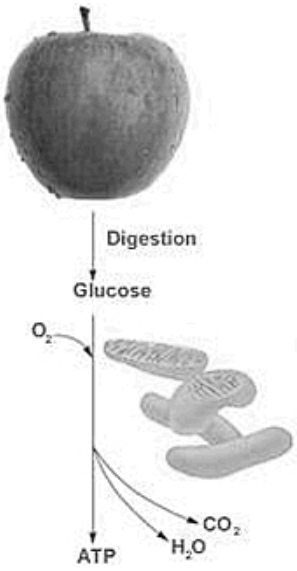
A. carbohydrates
B. lipids
C. nucleic acids
D. proteins

46.

What function do phospholipids perform in living organisms?

A. They are used for short-term energy storage.
B. They serve as the building blocks for proteins.
C. They make up the major component of cell membranes.
D. They store information in the nucleus of a cell.

47.



Identify the cell organelles shown, which perform the final steps of food digestion in the production of ATP energy.

A. nucleus
B. mitochondria
C. Golgi apparatus
D. endoplasmic reticulum

48.

Which cell organelle is responsible for the regulation of cell reproduction in mitosis or meiosis?

A. nucleus
B. mitochondria
C. Golgi apparatus
D. endoplasmic reticulum

49.

Which statement regarding proteins is true?

A. Proteins are used to carry the genetic code in the nucleus of a cell.
B. Proteins make up most of the cell and tissue structures in animals.
C. Proteins are synthesized in the mitochondria of the cell.
D. Proteins are the building blocks of amino acids.

50.

What organelle uses the instructions carried by messenger RNA and the amino acids carried by transfer RNA to assemble proteins in the cell?

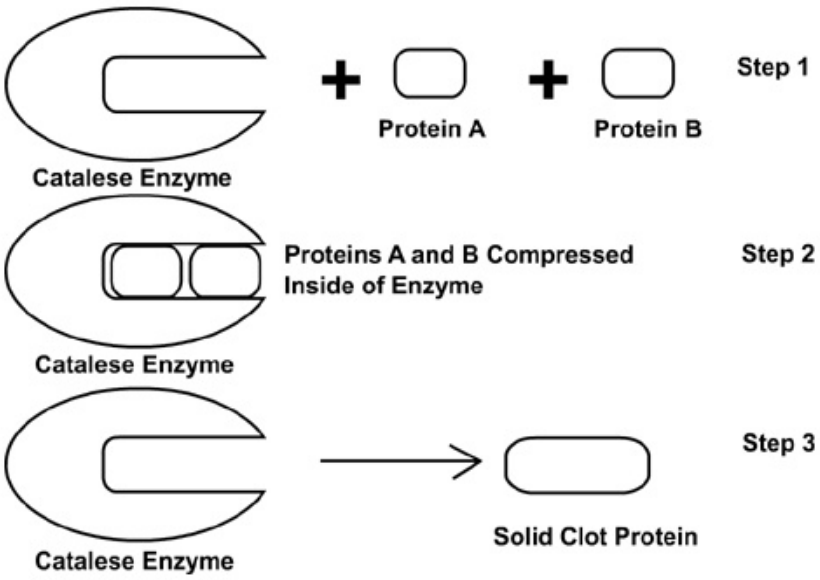
A. Golgi body
B. lysosome
C. nucleus
D. ribosome

51.

Which statement is correct, with regard to the catalase enzyme catalyzing the breakdown of hydrogen peroxide into water and oxygen?

A. Water is a substrate in this reaction.
B. Bonds in the hydrogen peroxide are weakened in catalase's active site, allowing the chemical reaction to occur.
C. Hydrogen peroxide is produced by the catalase enzyme.
D. The breakdown of hydrogen peroxide would still occur naturally, but occurs less rapidly with the catalase enzyme.

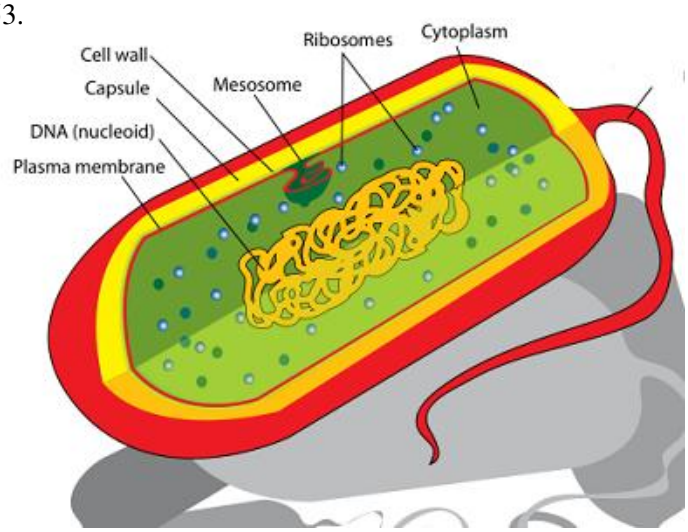
52.



The diagram shows a stepwise reaction for the enzyme coagulase, which is involved in blood clotting. Which of the substances is the product?

A. coagulase enzyme
B. protein A
C. protein B
D. clot protein

53.



Which of the organelles shown is made of a sugary substance called peptidoglycan, protects the bacteria, and can be destroyed by antibiotic medicines?

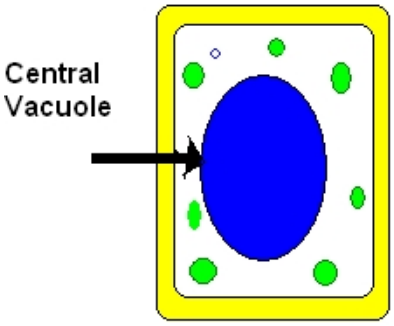
A. the ribosome
B. the plasma membrane
C. the cell wall
D. the capsule

54.

Which set of chemical reactions is performed by the chloroplast of the cell?

A. carbon dioxide + water $\rightarrow$ glucose + oxygen
B. glucose + oxygen $\rightarrow$ ATP energy + water + carbon dioxide
C. glucose $\rightarrow$ ATP energy + lactic acid
D. amino acids + tRNA + mRNA $\rightarrow$ proteins + tRNA + mRNA

55.



The diagram shows a plant cell with a large central vacuole. What would happen to this plant cell if the central vacuole was removed?

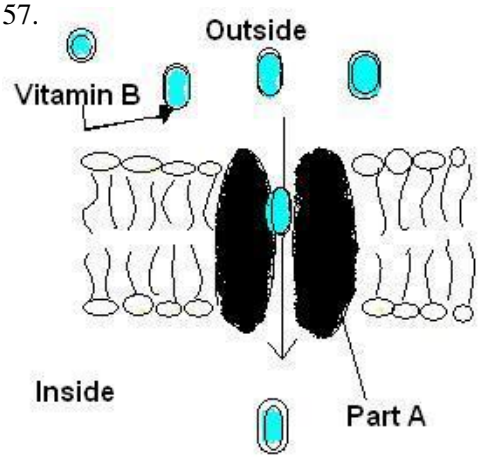
A. It would be unable to regulate water storage.
B. It would be unable to conduct photosynthesis.
C. It would be unable to conduct cellular respiration.
D. It would be unable to divide properly into two new cells.

56.

Edgar, a biochemist, claims to have found a new variety of a type of small biomolecule. Edgar notes that there are now 21 types of this biomolecule instead of the old known 20. The molecule can also be combined with others in its class to produce a wide variety of proteins, some liquid and others solid. What type of biomolecule did Edgar find?

A. a nucleic acid
B. a monosaccharide
C. an amino acid
D. a fatty acid

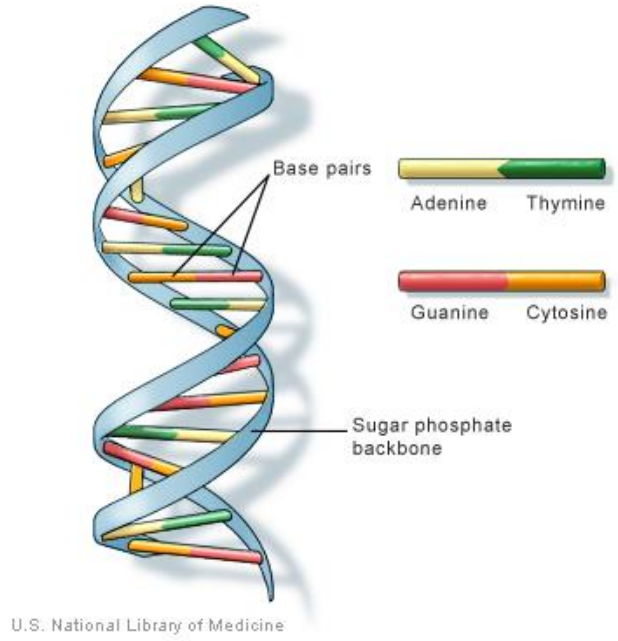
57.



The image shows the diffusion of vitamin B into a cell. What is part A, and in what organelle is it located?

A. a membrane protein; the nuclear membrane
B. a membrane protein; the cell membrane
C. an enzyme; the cytoplasm
D. an enzyme; the mitochondria

58.



Identify the biological function of the biomolecule shown.

A. long-term energy storage
B. information coding
C. short-term energy storage
D. catalysis of chemical reactions in cells

59.

The enzyme amylase is found in saliva and assists with the break down of starch into glucose. Explain how this occurs without affecting the chemical makeup of the amylase.

A. Amylase bonds to the starch to speed up the reaction and detaches itself when complete, without being affected.
B. Amylase does not take place in the starch reaction, but raises the temperature of the saliva to speed up the reaction.
C. Amylase changes starch into a vapor which increases the reaction rate, but is recreated by the glucose.
D. Amylase transfers all of its energy to the starch molecules to speed the reaction, but does not take place in the reaction.

60. **Compared to a skin cell, a muscle cell is likely to have more —**

A. Golgi bodies.

B. mitochondria.

C. cell membranes.

D. chloroplasts.

61. **A cell with numerous ribosomes is probably specialized for —**

A. enzyme storage.

B. energy production.

C. cell division.

D. protein synthesis.

62. **Which of the following organelles is present in both prokaryotes and eukaryotes?**

A. Nucleus

B. Ribosome

C. Golgi body

D. Endoplasmic reticulum

63. **Tissue samples taken from the heart and stomach of a grasshopper would be *expected* to have the same —**

A. cell shape.

B. cell size.

C. metabolic rates.

D. DNA.

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64. **Ice floats on a lake. This characteristic of water is responsible for —**

A. suffocation of aquatic organisms

B. mixing a lake's thermal layers

C. altering migration patterns of fish

D. preventing a lake from freezing solid

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65. **Some unicellular organisms are motile (have the ability to move) and some are nonmotile. Which cellular structures are associated with movement?**

A. Ribosomes

B. Flagella

C. Chloroplasts

D. Vacuoles

---

66. **When there is a lower concentration of water outside of a plant cell rather than inside a plant cell, the plant will tend to —**

A. grow toward the sun.

B. lose water and wilt.

C. gain water and become rigid.

D. increase its rate of photosynthesis.

---

67. **Amino acids link together by peptide bonds to form proteins. In which cellular organelle would this process occur?**

A. Mitochondrion

B. Ribosome

C. Lysosome

D. Golgi body

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68. **Some insects can stand on the surface of water because water —**

A. has a high specific heat.

B. has a high boiling point.

C. is a good evaporative coolant.

D. is cohesive and adhesive.

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69. **If transpiration stopped completely, how would a plant's homeostasis first be affected?**

A. More carbon dioxide molecules would be taken in by leaves.

B. Fewer sugars stored in roots and stems would diffuse into the soil.

C. Carbohydrates would no longer be formed.

D. Water molecules would not be released from leaves.

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70. **The main difference between prokaryotic and eukaryotic cells is that —**

A. prokaryotic cells are always much larger.

B. prokaryotic cells do not have a plasma membrane.

C. eukaryotic cells have a smaller cell nucleus.

D. eukaryotic cells have a more advanced cellular organization.

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71. **Which of the following macromolecules are a prominent part of animal tissues that function in insulation, helping animals conserve heat?**

A. Carbohydrates

B. Lipids

C. Proteins

D. Nucleic acids

---

72. **What characteristic do all living things share?**

A. They contain DNA.

B. They are made up of many parts.

C. They reproduce by mitosis.

D. They need oxygen to survive.

73. **Some peeled pieces of apple were placed in distilled water and some in very salty water. The cells in the apple pieces will —**

A. lose water in both solutions

B. gain water in both solutions

C. lose water in the distilled water and gain water in the salty water

D. gain water in the distilled water and lose water in the salty water

Answer Key

1. A) shrink.

2. A) $6H_20 + 6C0_2 \rightarrow C_6H_{12}O_6 + 6O_2$

3. A) energy

4. D) metaphase

5. C) 46

6. D) does not require energy from ATP to take place.

7. B) homeostasis.

8. A) deep-sea waters because solutes remain at a fairly constant level

9. A) carbon, hydrogen, and oxygen.

10. A) ATP.

11. B) energy is released and changes ATP to ADP.

12. C) binary fission.

13. B) The size of each type of cell varies greatly.

14. D) the process occurs naturally and requires no energy.

15. A) isotonic.

16. A) prophase $\rightarrow$ metaphase $\rightarrow$ anaphase $\rightarrow$ telophase

17. D) 32 chromosomes.

18. D) Nuclear material in the cell divides equally.

19. D) vacuoles.

20. C) mitochondrion

21. A) cell membrane.

22. B) nucleic acids

23. B) I and III only

24. C) passive transport.

25. A) carbohydrates

26. B) peptide bonds

27. D) vacuole

28. D) A substance moves across a membrane without using cellular energy.

29. A) Mitosis is essential to cell replication, tissue development, and maintenance of cell size.

30. A) Water leaves the tubules of the kidney in response to the hypertonic fluid surrounding the tubules.

31. C) homeostasis

32. D) prokaryotic

33. A) assemble into multicellular organisms

34. D) A and C

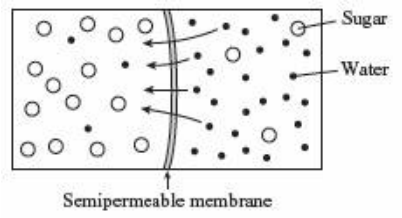
35. C) shrink in size

36. A) The cells use more energy.

37. D) Eukaryotic cells are more structurally complex than prokaryotic cells.

38. A) active transport

39. C) Lysozyme breaks a specific type of bond in a bacterial cell wall molecule.

40. A) 

41. B) to deliver proteins to other locations in the cell

42. D) hold the cytoplasm and other organelles into shape.

43. A) carbohydrates

44. B) Enzymes are proteins that lower the activation energy for chemical reactions.

45. B) lipids

46. C) They make up the major component of cell membranes.

47. B) mitochondria

48. A) nucleus

49. B) Proteins make up most of the cell and tissue structures in animals.

50. D) ribosome

51. B) Bonds in the hydrogen peroxide are weakened in catalase's active site, allowing the chemical reaction to occur.

52. D) clot protein

53. C) the cell wall

54. A) carbon dioxide + water $\rightarrow$ glucose + oxygen

55. A) It would be unable to regulate water storage.

56. C) an amino acid

57. B) a membrane protein; the cell membrane

58. B) information coding

59. A) Amylase bonds to the starch to speed up the reaction and detaches itself when complete, without being affected.

60. B) mitochondria.

61. D) protein synthesis.

62. B) Ribosome

63. D) DNA.

64. D) preventing a lake from freezing solid

65. B) Flagella

66. B) lose water and wilt.

67. B) Ribosome

68. D) is cohesive and adhesive.

69. D) Water molecules would not be released from leaves.

70. D) eukaryotic cells have a more advanced cellular organization.

71. B) Lipids

72. A) They contain DNA.

73. D) gain water in the distilled water and lose water in the salty water