Name _____

1. The cell theory states that

   A) living organisms are composed of cells that arise from preexisting cells
   B) organisms that lack certain organelles reproduce by binary fission
   C) all cells regenerate and contain the same basic structures
   D) all cells have nuclei that contain genetic information

2. Which cell structure is correctly paired with its primary function?

   A) mitochondrion–movement
   B) ribosome–protein synthesis
   C) nucleus–storage of nutrients
   D) vacuole–cell division

3. Muscle cells in athletes often have more mitochondria than muscle cells in nonathletes. Based on this observation, it can be inferred that the muscle cells in athletes

   A) have a greater demand for energy than the muscle cells of nonathletes
   B) reproduce less frequently than the muscle cells of nonathletes
   C) have a smaller demand for cell proteins than the muscle cells of nonathletes
   D) have nuclei containing more DNA than nuclei in the muscle cells of nonathletes

4. One difference between plant and animal cells is that animal cells do *not* have

   A) chloroplasts B) a nucleus
   C) a cell membrane D) centrioles

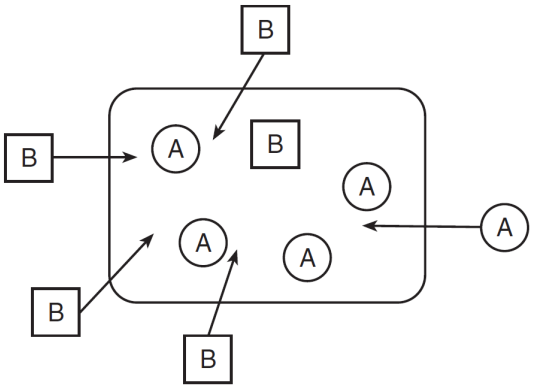
5. What cellular structure must oxygen cross to get from the outside to the inside of an animal cell?

   A) The cell wall B) The nucleus
   C) The cytoplasm D) The cell membrane

6. A substance is most likely to diffuse into a cell when

   A) it is enclosed in an organelle such as a vacuole
   B) the pH of the substance is greater than the pH of the cell
   C) it is a large organic food molecule such as protein or starch
   D) the concentration of the substance is greater outside the cell than inside

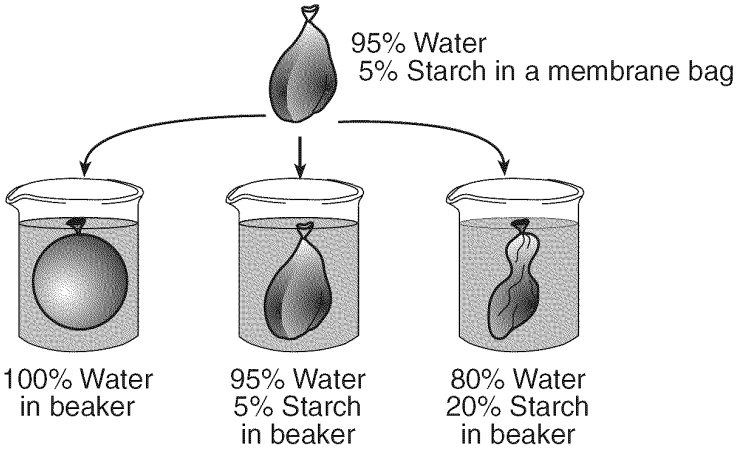
7. The diagram below shows two different kinds of substances, *A* and *B*, entering a cell.



ATP is most likely being used for

A) substance *A* to enter the cell
B) substance *B* to enter the cell
C) both substances to enter the cell
D) neither substance to enter the cell

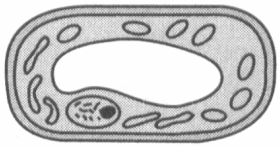
8. Base your answer to the following question on An investigation was set up to study the movement of water through a membrane. The results are shown in the diagram below.



Based on these results, which statement correctly predicts what will happen to red blood cells when they are placed in a beaker containing a water solution in which the salt concentration is much higher than the salt concentration in the red blood cells?

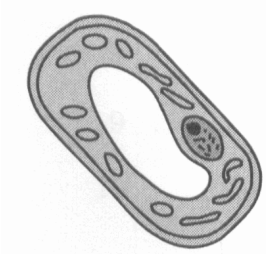
A) The red blood cells will lose water and decrease in size.
B) The red blood cells will first lose water, then absorb water, and finally double in size.
C) The red blood cells will first absorb water, then lose water and maintain their normal size.
D) The red blood cells will absorb water and increase in size.

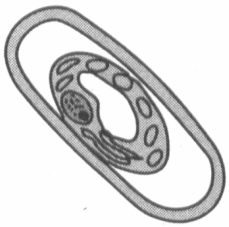
9. Base your answer to the following question on The diagram below represents a plant cell in tap water as seen with a compound light microscope.

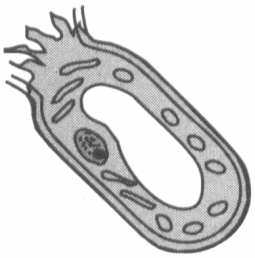


Which diagram best represents the appearance of the cell after it has been placed in a 15% salt solution for two minutes?

A)


B)


C)


D)


10. Plant cells can synthesize energy-rich organic molecules, and later break them down to extract that energy for performing life processes. These activities require direct interaction between the

A) cell walls and ribosomes
B) ribosomes and mitochondria
C) chloroplasts and mitochondria
D) chloroplasts and vacuoles

11. Leaves of green plants contain openings known as stomates, which are opened and closed by specialized cells allowing for gas exchange between the leaf and the outside environment. Which phrase best represents the net flow of gases involved in photosynthesis into and out of the leaf through these openings on a sunny day?

A) carbon dioxide and oxygen move in; ozone moves out
B) water and ozone move in; carbon dioxide moves out
C) oxygen moves in; nitrogen moves out
D) carbon dioxide moves in; oxygen moves out

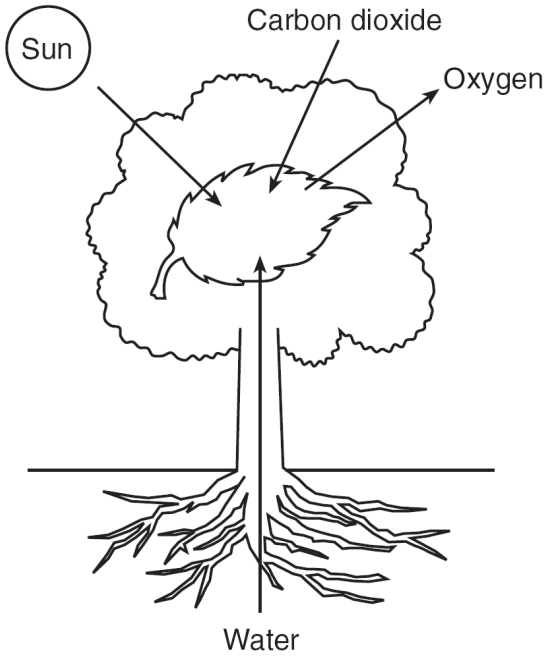
12. What does the process of photosynthesis produce?

A) protein, which is metabolized into less complex molecules by dehydration synthesis
B) glucose, which is metabolized into more complex carbohydrates by dehydration synthesis
C) starch, which is metabolized into less complex molecules by dehydration synthesis
D) glycerol, which is metabolized into more complex carbohydrates by dehydration synthesis

13. Which substances must a green plant obtain from its environment to carry on photosynthesis?

A) carbon dioxide and oxygen
B) carbon dioxide and water
C) oxygen and chlorophyll
D) glucose and water

14. Base your answer to the following question on The diagram below represents events associated with a biochemical process that occurs in some organisms.



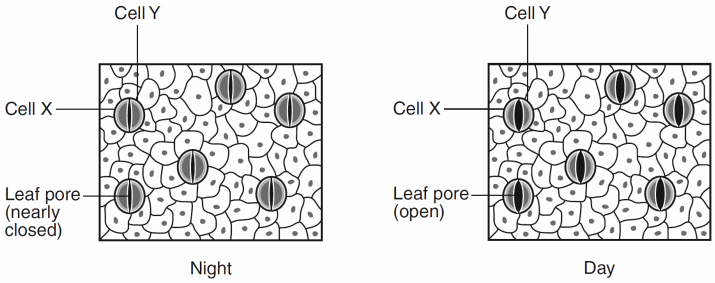
Which statement concerning this process is correct?

A) The process represented is respiration and the primary source of energy for the process is the Sun.
B) The process represented is photosynthesis and the primary source of energy for the process is the Sun.
C) This process converts energy in organic compounds into solar energy which is released into the atmosphere.
D) This process uses solar energy to convert oxygen into carbon dioxide.

15. By which process are CO_2 and H_2O converted to carbohydrates?

A) fermentation
B) respiration
C) photosynthesis
D) transpiration

16. The diagram below represents changes in the sizes of openings present in leaves as a result of the actions of cells *X* and *Y*.



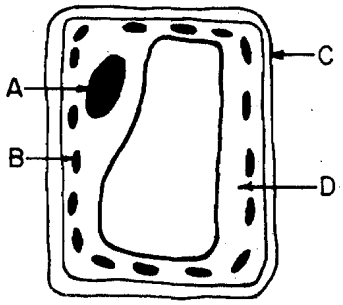
The actions of cells *X* and *Y* help the plant to

A) maintain homeostasis by controlling water loss
B) absorb light energy necessary for cellular respiration
C) store excess heat during the day and remove the heat at night
D) detect changes in the biotic factors present in the environmen

17. Which organelle is the site of cellular respiration?

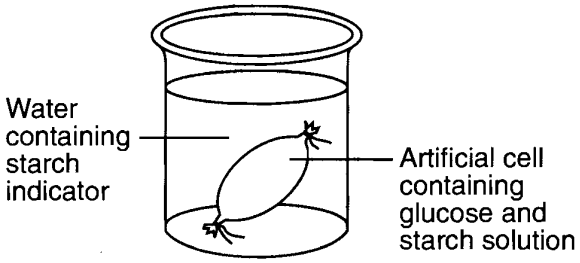
A) chloroplast function
B) ribosomes
C) endoplasmic reticulum
D) mitochondria

18. Which structures in the diagram below enable the observer to identify it as a plant cell?



A) *A* and *C*
B) *B* and *C*
C) *B* and *D*
D) *A* and *B*

19. Base your answer to the following question on the laboratory setup illustrated below and on your knowledge of biology.



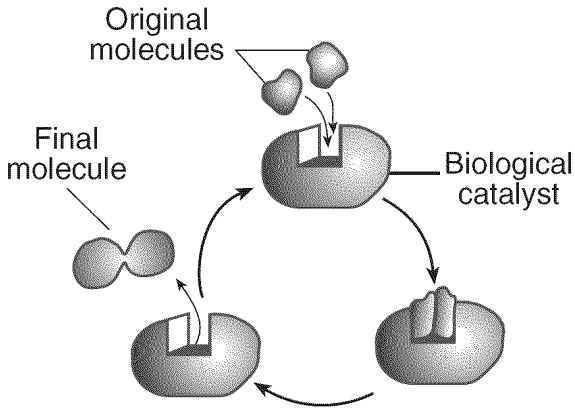
This laboratory setup would most likely be used to demonstrate

A) carbohydrate synthesis
B) dehydration
C) active transport
D) diffusion

20. Which class of molecules is responsible for speeding up chemical reactions?

A) Genetic material
B) Sugars
C) Fats
D) Enzymes

21. Base your answer to the following question on The diagram below represents a series of reactions that can occur in an organism.



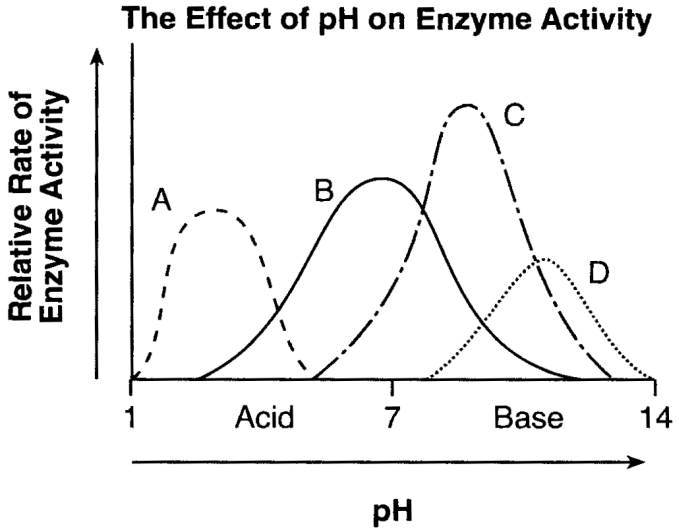
This diagram best illustrates the relationship between

A) ribosomes and sugars
B) amino acids and glucose
C) enzymes and synthesis
D) antigens and immunity

22. Base your answer to the following question on the information and graph below and on your knowledge of biology.

The pH of the internal environment of lysosomes (organelles that contain digestive enzymes) is approximately 4.5, while the pH of the surrounding cytoplasm is approximately 7. The average pH of the human stomach during digestion is approximately 2.5, while the average pH of the small intestine during digestion is about 8.

The graph below shows how pH affects the enzyme activity of four different enzymes, *A, B,* C, and *D.*



Which enzyme functions best in a pH environment most similar to that of human stomach enzymes?

A) *A* B) *B* C) *C* D) *D*

23. Meat tenderizer contains an enzyme that interacts with meat. If meat is coated with tenderizer and then placed in a refrigerator for a short time, how would the enzyme be affected?

A) Its shape would change.
B) It would no longer act as an enzyme.
C) Its activity would slow down.
D) It would be broken down.

24. The enzyme amylase will affect the breakdown of carbohydrates, but it will not affect the breakdown of proteins. The ability of an enzyme molecule to interact with specific molecules is most directly determined by the

A) amount of glucose present in the cell
B) sequence of bases present in ATP
C) number of molecules involved
D) shapes of the molecules involved

25. The energy used to obtain, transfer, and transport materials within an organism comes directly from

A) ATP B) DNA
C) sunlight D) starch

26. A student prepared a test tube containing yeast, glucose, and water. After 24 hours, the test tube was analyzed for the presence of several substances.

What substance would the student expect to find if respiration occurred in the test tube?

A) starch B) a hormone
C) carbon dioxide D) nitrogen

27. Which part of a molecule provides energy for life processes?

A) oxygen atoms B) chemical bonds
C) inorganic nitrogen D) carbon atoms

28. Which process is directly responsible for the synthesis of adenosine triphosphate molecules?

A) circulation B) digestion
C) excretion D) respiration

29. What are possible products of certain types of anaerobic respiration?

A) water and oxygen
B) pyruvic acid and glycerol
C) alcohol and carbon dioxide
D) nitrogen gas and ammonia

30. Which term best defines a bacteria that can survive without oxygen?

A) heterotrophic B) anaerobic
C) saprophytic D) aerobic

31. What process *may* cause lactic acid to form?

A) photosynthesis
B) anaerobic respiration
C) photolysis
D) aerobic respiration

32. The presence of lactic acid in the cells of an animal's muscle tissue is an indication that the

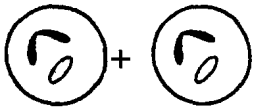
A) animal carries on a complex form of respiration during daylight hours
B) muscle cells have been active during a period of oxygen deficiency
C) animal is not adapted to the use of glucose
D) number of mitochondria in the muscle cells has increased

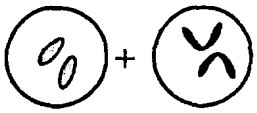
33. Which process allows a mammal to continue to grow in size?

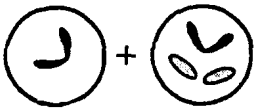
A) mitosis of body cells
B) meiosis of sex cells
C) mitosis of sex cells
D) meiosis of body cells

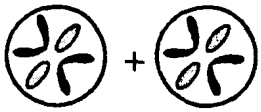
34. Base your answer to the following question on The diagram below represents chromosomes in a zygote.

Which diagrams best illustrate the daughter cells that result from normal mitotic cell division of this zygote?

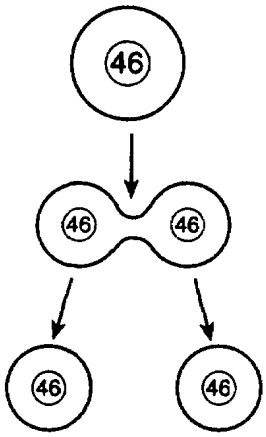
A) 

B) 

C) 

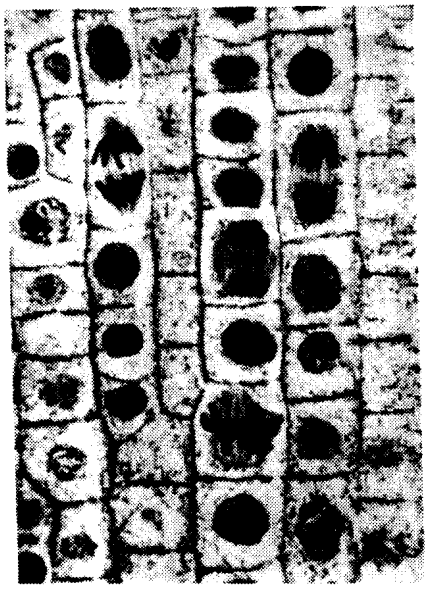
D) 

35. Base your answer to the following question on The diagram below can be used to illustrate a process directly involved in



A) sexual reproduction B) meiosis
C) tissue repair D) recombination

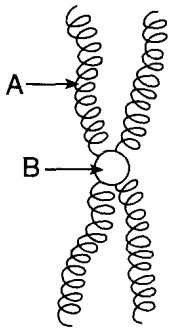
36. Base your answer to the following question on A photomicrograph of cells involved in various stages of nuclear division is shown below.



Which title is most appropriate for this photomicrograph?

A) Gametogenesis in Yeast Cells
B) Mitosis in an Onion Root Tip
C) Meiosis in Male Gametes
D) Cell Division in Human Blood Cells

37. Base your answer to the following question on The diagram below represents a microscopic structure observed during cell division.



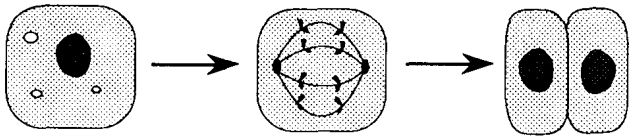
Which parts of the structure are indicated by arrows *A* and *B*, respectively?

A) homologous chromosome and spindle fiber
B) centriole and tetrad
C) chromatid and centromere
D) autosome and allele

38. The process of mitotic cell division normally results in the production of

A) four cells with half the number of chromosomes as the parent cell
B) two cells with only one chromosome from each set of homologous chromosomes
C) two cells with the same number of chromosomes as the parent cell
D) one cell with a replicated set of homologous chromosomes

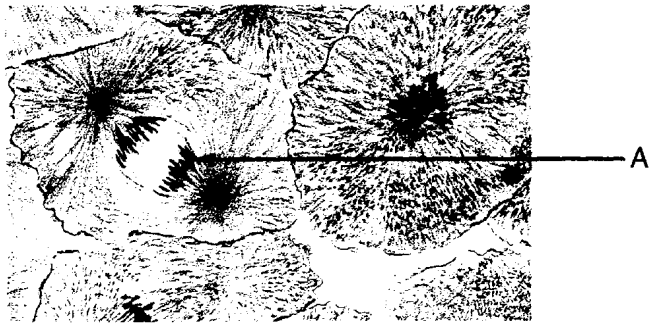
39. Base your answer to the following question on The diagrams below represent a cell process.



If the cell in diagram 1 contains 4 chromosomes, what is the total number of chromosomes in each cell in diagram 3?

A) 8 B) 2 C) 16 D) 4

40. Base your answer to the following question on Cells of a whitefish embryo were viewed under high power of a compound microscope and a photograph was taken as shown below.



Which structures are indicated by *A*?

A) centrioles B) chromosomes
C) ribosomes D) centrosomes

41. Melanoma is a type of cancer in which abnormal skin cells divide uncontrollably. Some chemotherapy drugs, which stop the growth of the cancer, directly interfere with the process of

A) meiosis B) mitosis
C) recombination D) coordination

42. Which human disorder is characterized by a group of abnormal body cells that suddenly begin to undergo cell division at a very rapid rate?

A) hemophilia
B) color blindness
C) cancer
D) albinism

43. Base your answer to the following question on the diagrams below and on your knowledge of biology.

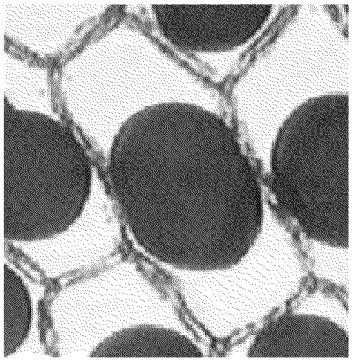


Diagram 1: red onion cells

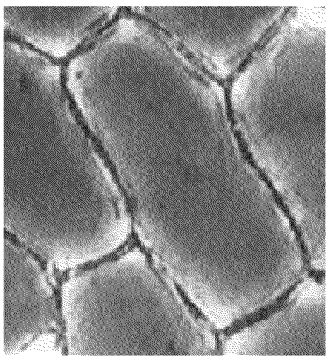


Diagram 2: red onion cells

List the laboratory procedures to follow that would cause the cells in diagram 1 to resemble the cells in diagram 2.

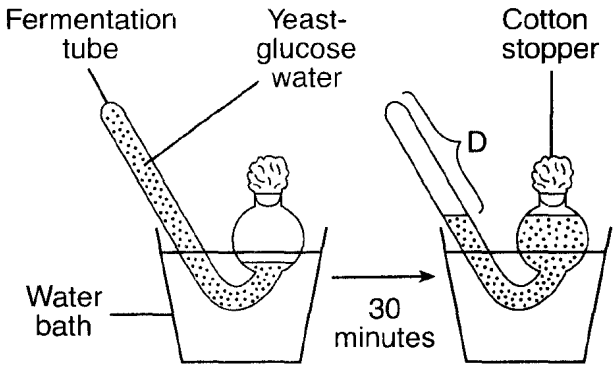
Base your answers to questions **44** and **45** on the information below and on your knowledge of biology

Yeast cells carry out the process of cellular respiration as shown in the equation below.

$$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$$

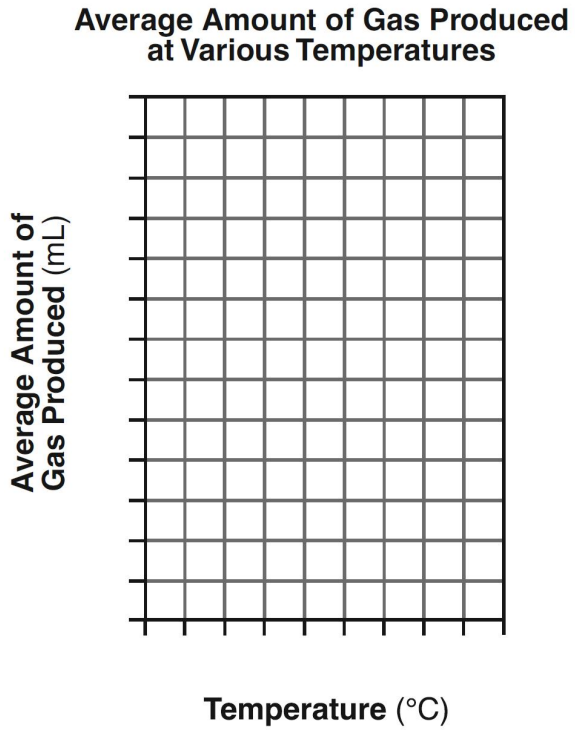
glucose	ethyl alcohol	carbon dioxide

An investigation was carried out to determine the effect of temperature on the rate of cellular respiration in yeast. Five experimental groups, each containing five fermentation tubes, were set up. The fermentation tubes all contained the same amounts of water, glucose, and yeast. Each group of five tubes was placed in a water bath at a different temperature. After 30 minutes, the amount of gas produced (*D*) in each fermentation tube was measured in milliliters. The average for each group was calculated. A sample setup and the data collected are shown below.

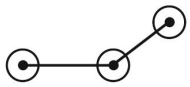


Average Amount of Gas Produced (D) After 30 Minutes at Various Temperatures

Group	Temperature (°C)	D (mL)
1	5	0
2	20	5
3	40	12
4	60	6
5	80	3



44. Plot the data from the data table. Surround each point with a small circle, and connect the points.

Example: 

45. Mark an appropriate scale on each labeled axis.

Biology (Living Environment)

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