

Regents Review: Cells & Cell Transport

1. All of the following are true regarding cells except?

- A) All cells have genetic material
- B) All cells have cell walls**
- C) All cells have plasma membranes
- D) All cells can divide to form new cells

2. What is common to all cells?

- A) All cells have a cell wall
- B) All cells are photosynthetic
- C) All cells divide to form new cells**
- D) All cells have a nucleus

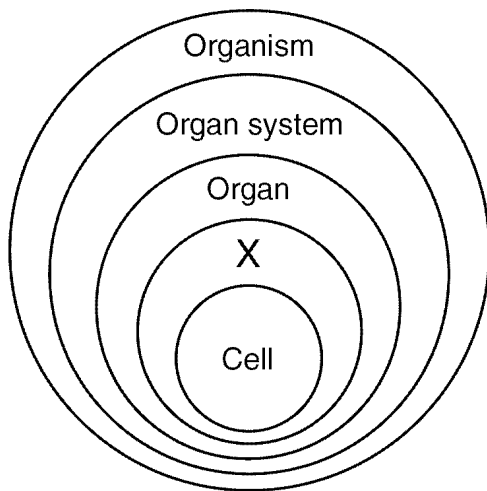
3. What is a similarity between all bacteria and plants?

- A) They both have a nucleus
- B) They are both composed of cells**
- C) They both have chloroplasts
- D) They both lack a cell wall

4. A deletion of a DNA segment alters a gene in a single skin cell of an individual. Which statement best describes a result of this mutation?

- A) Any cell produced from this skin cell will have the same mutation.**
- B) All offspring of the individual will have a skin cell mutation.
- C) The mutation will spread into other types of cells.
- D) The gametes of this individual will have the same mutation.

5. The diagram below represents levels of organization in living things.



Which term would best represent X?

- A) human
- B) tissue**
- C) stomach
- D) chloroplast

6. Which sequence of terms is in the correct order from simplest to most complex?

- A) cells → tissues → organs → organ systems**
- B) tissues → organisms → cells → organ systems
- C) cells → tissues → organ systems → organs
- D) organs → organisms → organ systems → cells

7. Which statement is *not* a part of the cell theory?

- A) Cells are the basic unit of structure of living things.
- B) Cells are the basic unit of function of living things.
- C) Cell parts such as chloroplasts are self-replicating.**
- D) Cells come from preexisting cells.

8. During an experiment you want to view the nucleus of a cell. How would you most easily view this organelle?

- A) With a microscope**
- B) With the naked eye
- C) Using a magnifying glass
- D) You could not see the nucleus with any of these instruments

9. Which structure is best observed using a compound light microscope?

- A) a cell**
- B) a virus
- C) a DNA sequence
- D) the inner surface of a mitochondrion

10. Which statement best describes the organelles in a cell?

- A) All organelles are involved directly with communication between cells.
- B) Organelles must work together and their activities must be coordinated.**
- C) Organelles function only when there is a disruption in homeostasis.
- D) Each organelle must function independently of the others in order to maintain homeostasis.

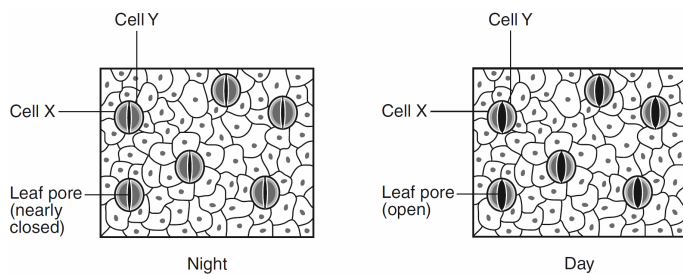
11. Which cell structures are correctly paired with their functions?

- A) The mitochondria produce enzymes, and ribosomes transport them.
- B) The ribosomes make proteins, and the nucleus stores genetic information.**
- C) The cell membrane makes enzymes, and cytoplasm transports them.
- D) The vacuole stores genetic information, and chloroplasts make proteins.

12. In a multicellular organism, organs carry out a variety of life functions. In a single-celled organism, these functions are performed by

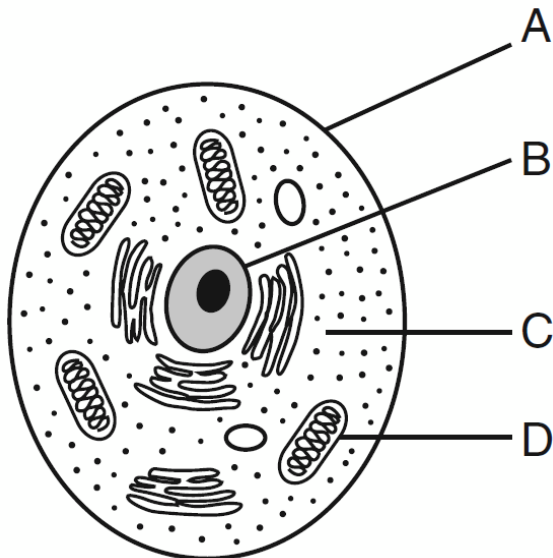
- A) tissues
- B) organelles**
- C) organ systems
- D) organs

13. 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) store excess heat during the day and remove the heat at night
 C) absorb light energy necessary for cellular respiration
 D) detect changes in the biotic factors present in the environment
14. The letters in the diagram below indicate some parts of a cell.



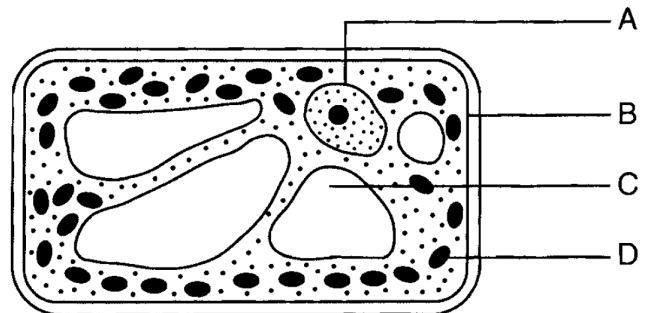
The function of which cell part is most similar to that of the human excretory system?

- A) *A* B) *B* C) *C* D) *D*
15. The cell membrane is to the cell as
- A) the ocean is to the Earth
 B) **the atmosphere is to the Earth**
 C) a house is to the Earth
 D) a forest is to the Earth
16. What cellular structure must oxygen cross to get from the outside to the inside of an animal cell?
- A) The nucleus
 B) The cytoplasm
 C) **The plasma membrane**
 D) The cell wall

17. Which two cell structures work together in the process of protein synthesis?

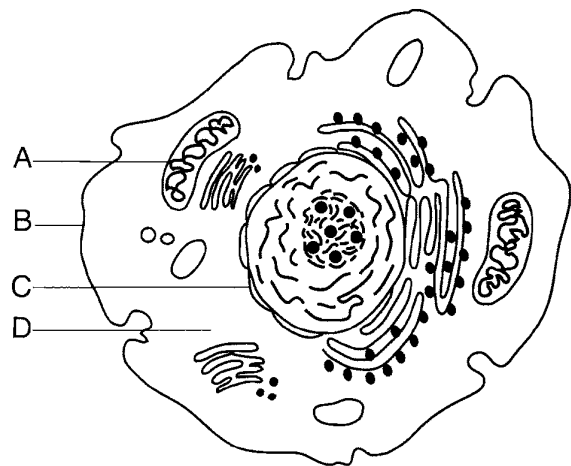
- A) nucleus and chloroplast
 B) ribosome and vacuole
 C) **nucleus and ribosome**
 D) mitochondrion and cell membrane

18. The cell represented below produces oxygen.



Which structure allows the passage of this oxygen to the environment?

- A) *A* B) ***B*** C) *C* D) *D*
19. In the diagram below, which letter indicates the part of the cell that carries out a function most similar to a function of the human excretory system?

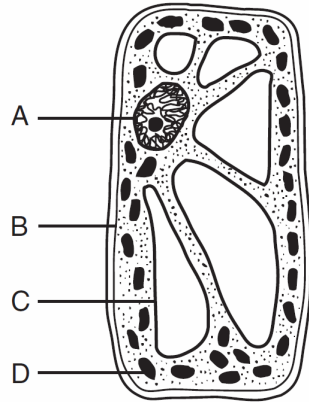


- A) *A* B) ***B*** C) *C* D) *D*
20. Which cell structure is correctly paired with its primary function?
- A) **ribosome—protein synthesis**
 B) mitochondrion—movement
 C) vacuole—cell division
 D) nucleus—storage of nutrients
21. The chloroplast is to a plant as
- A) a window is to a building
 B) **a solar cell is to a building**
 C) a room is to a building
 D) the roof is to a building

22. The mitochondria is to the cell as

- A) **the motor is to a car**
- B) the windshield is to a car
- C) the door is to a car
- D) the seatbelt is to a car

23. The diagram below represents a cell of a green plant.



Solar energy is used to produce energy-rich compounds in structure

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

24. The cytoplasm is to the cell as

- A) rocks are to the ocean
- B) fish are to the ocean
- C) **water is to the ocean**
- D) the coral reef is to the ocean

25. The nucleus is the cell as

- A) the bones are to a human
- B) the heart is to human
- C) the muscles are to a human
- D) **the brain is to a human**

26. Within which structure of an animal cell does DNA replication take place?

- A) vacuole
- B) cell membrane
- C) **nucleus**
- D) ribosome

27. What is the main function of a vacuole in a cell?

- A) **storage**
 - B) coordination
 - C) synthesis of molecules
 - D) release of energy
-

28. Which row in the chart below contains a cell structure paired with its primary function?

| Row | Cell Structure | Function |
|-----|----------------|-----------------------------------|
| (1) | ribosome | protein synthesis |
| (2) | vacuole | production of genetic information |
| (3) | nucleus | carbohydrate synthesis |
| (4) | mitochondrion | waste disposal |

A) 1

B) 2

C) 3

D) 4

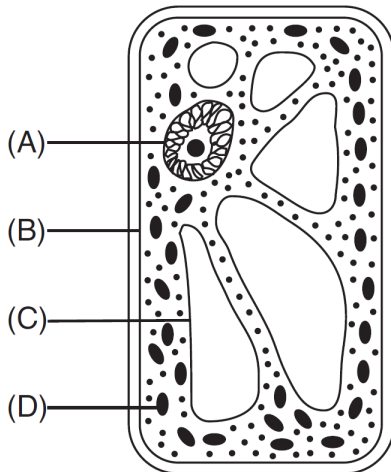
29. The swordfish contains a heat generating organ that warms its brain and eyes up to 14°C above the surrounding ocean water temperature. Which structures are most likely to be found at relatively high concentrations within the cells of this heat generating organ?

- A) nuclei B) chloroplasts
C) chromosomes D) **mitochondria**

30. If the ribosomes of a cell were destroyed, what effect would this most likely have on the cell?

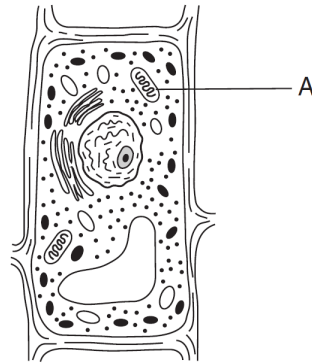
- A) It would stimulate mitotic cell division.
B) The cell would be unable to synthesize proteins.
C) Development of abnormal hereditary features would occur in the cell.
D) Increased protein absorption would occur through the cell membrane.

31. In the cell shown below, which lettered structure is responsible for the excretion of most cellular wastes?



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

32. The diagram below represents a plant cell.



Which process takes place in structure A?

- A) cellular respiration** B) photosynthesis
C) digestion of fats D) protein synthesis

33. The data table below shows the presence or absence of DNA in four different cell organelles.

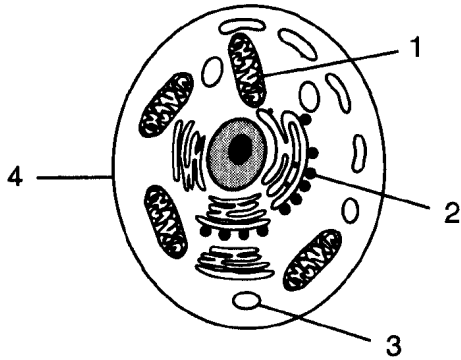
Data Table

| Organelle | DNA |
|---------------|---------|
| cell membrane | absent |
| cell wall | absent |
| mitochondrion | present |
| nucleus | present |

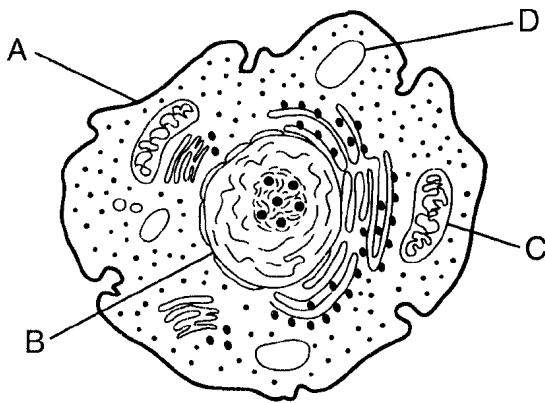
Information in the table suggests that DNA functions

- A) within cytoplasm and outside of the cell membrane
B) both inside and outside of the nucleus
C) only within energy-releasing structures
D) within cell vacuoles

34. Within which structure shown in the diagram below are energy-rich organic compounds used to produce ATP?

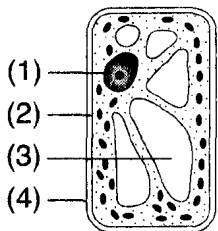


- A) 1 B) 2 C) 3 D) 4
35. Which structures carry out life functions within cells?
- A) tissues B) organ systems
C) **organelles** D) organs
36. The diagram below represents a cell.



Which statement concerning ATP and activity within the cell is correct?

- A) The absorption of ATP occurs at structure *A*.
B) The synthesis of ATP occurs within structure *B*.
C) **ATP is produced most efficiently by structure *C*.**
D) The template for ATP is found in structure *D*.
37. Which cell structure contains information needed for protein synthesis?

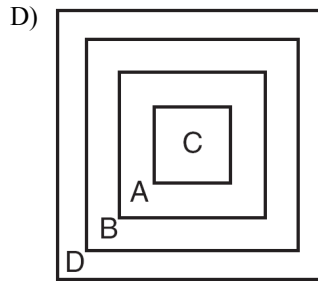
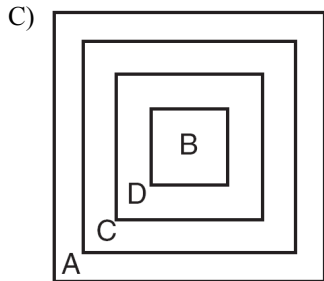
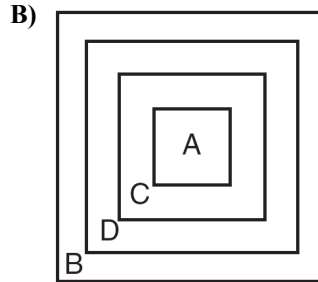
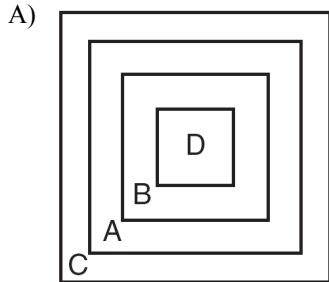


- A) 1 B) 2 C) 3 D) 4

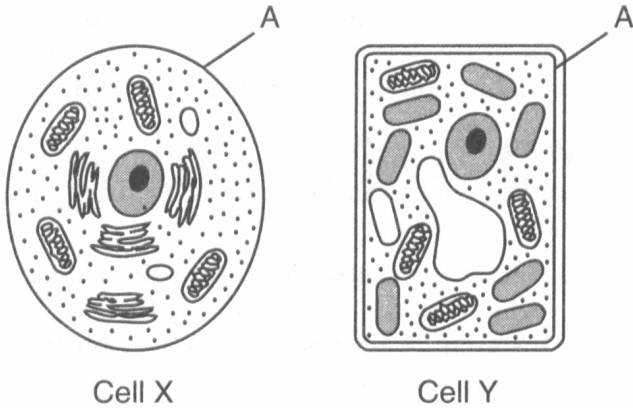
38. Which diagram represents the relative sizes of the structures listed below?

Structures

| | |
|---|------------|
| A | gene |
| B | cell |
| C | chromosome |
| D | nucleus |



39. The diagram below represents two cells, *X* and *Y*.



Which statement is correct concerning the structure labeled A?

- A) It aids in the removal of metabolic wastes in both cell *X* and cell *Y*.
- B) It is involved in cell communication in cell *X*, but not in cell *Y*.
- C) It prevents the absorption of CO₂ in cell *X* and O₂ in cell *Y*.
- D) It represents the cell wall in cell *X* and the cell membrane in cell *Y*.

40. Certain poisons are toxic to organisms because they interfere with the function of enzymes in mitochondria. This results directly in the inability of the cell to

- A) store information
- B) build proteins
- C) **release energy from nutrients**
- D) dispose of metabolic wastes

41. What organelle releases energy for metabolic activity in cells?

- A) chloroplast
- B) ribosome
- C) **mitochondrion**
- D) vacuole

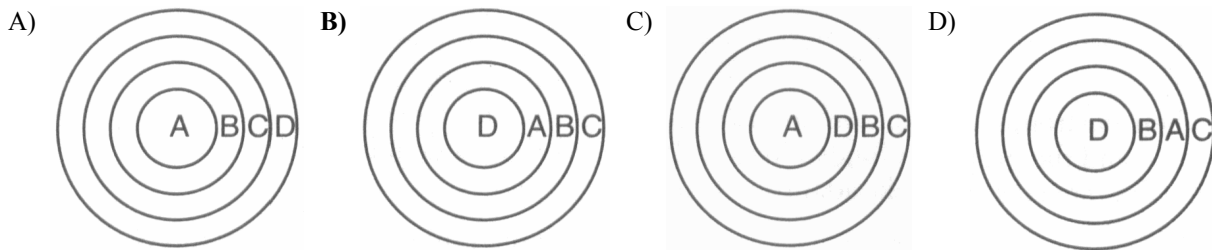
42. Which diagram best represents the relative locations of the structures in the list below?

A—chromosome

B—nucleus

C—cell

D—gene



43. As a human red blood cell matures, it loses its nucleus. After losing its nucleus, what ability does a mature red blood cell lack?

A) take in material from the blood

B) release hormones to the blood

C) pass through artery walls

D) carry out cell division

44. What has to be properly functioning in a unicellular organism for homeostasis to be maintained?

A) organelles

B) insulin

C) guard cells

D) antibodies

45. Which sequence best represents increasing complexity?

A) tissues → cells → organelles → organs

B) cells → organelles → organs → organism

C) organelles → cells → tissues → organs

D) organism → cells → tissues → organelle

46. A similarity between humans and many other multicellular animals is that they

A) occupy the same niche in most food webs

B) are composed of organ systems

C) have the same DNA sequences

D) carry out autotrophic nutrition

47. The diagram below represents an incomplete sequence of levels of organization.

organelles → tissues → organs → organ systems → organism

This sequence can be completed correctly by inserting

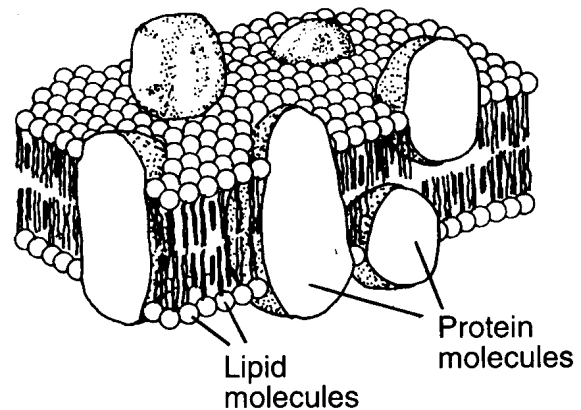
A) "cells" → between organelles and tissues

B) "proteins" → between tissues and organs

C) "populations" → between organs and organ systems

D) "molecules" → between organ systems and organisms

48. Which cell structure is represented by the three-dimensional diagram below?



A) chloroplast

B) mitochondrion

C) plasma membrane

D) replicated chromosome

49. The fluid-mosaic model of the cell membrane suggests that the membrane is primarily composed of

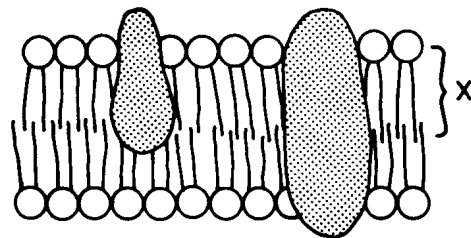
A) proteins and starches

B) carbohydrates and lipids

C) sugars and proteins

D) proteins and lipids

50. The diagram below represents a section of a plasma membrane.



What does structure X represent?

A) a protein

B) glucose

C) a lipid

D) glycogen

51. A function of cell membranes in humans is the

A) synthesis of the amino acids

B) production of energy

C) replication of genetic material

D) recognition of certain chemicals

52. Some human structures and their functions are listed below.

| Human Structures | Functions |
|------------------|---|
| alveoli | absorption of oxygen, excretion of carbon dioxide |
| kidney | excretion of salts and nitrogenous wastes |
| large intestine | absorption of water |

In a single-celled organism such as an amoeba, all these functions can be performed by the

- A) nucleus B) ribosomes
C) mitochondria D) **cell membrane**

53. When most proteins, fats, and carbohydrates are digested completely, they are converted to end products that

- A) **are soluble and can easily pass through cell membranes**
B) contain long chains of amino acids and fat acids
C) contain atoms of carbon, hydrogen, oxygen, and nitrogen
D) are a direct result of dehydration synthesis

54. Which molecule will most likely diffuse through a cell membrane?

- A) starch B) **water** C) protein D) DNA

55. In a cell, the selective permeability of the cell membrane is most closely associated with the maintenance of

- A) **homeostasis** B) hydrolysis
C) phagocytosis D) pinocytosis

56. Which row in the chart below best describes the active transport of molecule X through a cell membrane?

| Row | Movement of Molecule X | ATP |
|-----|--|----------|
| (1) | high concentration → low concentration | used |
| (2) | high concentration → low concentration | not used |
| (3) | low concentration → high concentration | used |
| (4) | low concentration → high concentration | not used |

- A) 1 B) 2 C) **3** D) 4

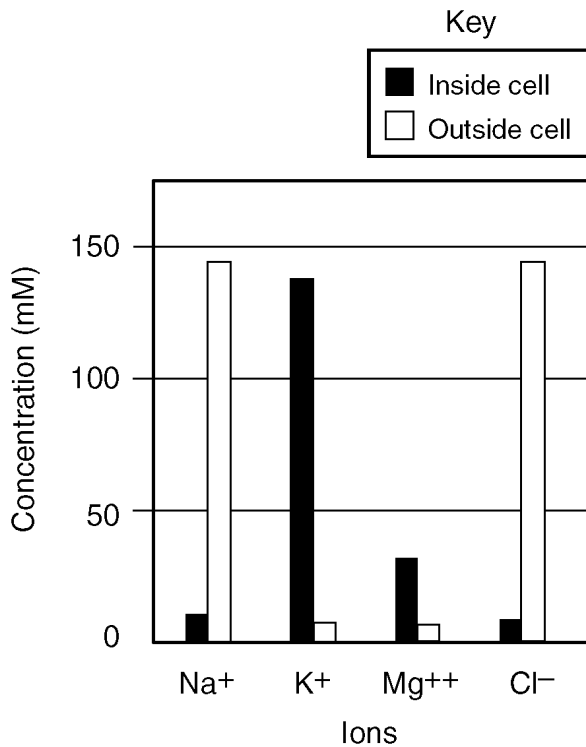
57. Base your answer to the following question on the information below and on your knowledge of Biology.

In a class, each student made three models of the small intestine using three artificial membrane tubes. They filled each of the three tubes with equal amounts of water, starch, protein, and vitamin C. They added starch-digesting enzyme to tube 1. They added protein-digesting enzyme to tube 2. No enzyme was added to tube 3. The ends of the membrane tubes were sealed and the tubes were soaked for 24 hours in beakers of pure water. The beakers were numbered 1, 2, and 3, corresponding to the number of the tube they contained. At the end of the experiment, the students removed the tubes and tested the water in the beakers for the presence of nutrients.

Which statement would be a valid inference if vitamin C had been present in the water in each beaker?

- A) The water synthesized vitamin C.
- B) Vitamin C is a small molecule.**
- C) The membrane tube produced vitamin C.
- D) The concentration of vitamin C is higher in the beaker than in the membrane tube.

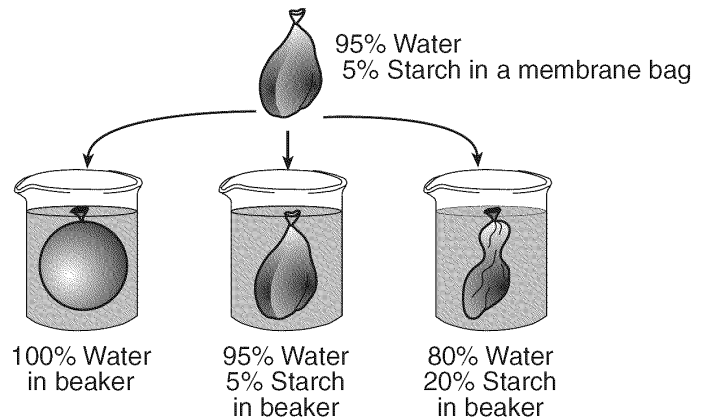
58. The graph below shows the relative concentrations of different ions inside and outside of an animal cell.



Which process is directly responsible for the net movement of K⁺ and Mg⁺⁺ into the animal cell?

- A) electrophoresis
- B) diffusion
- C) active transport**
- D) circulation

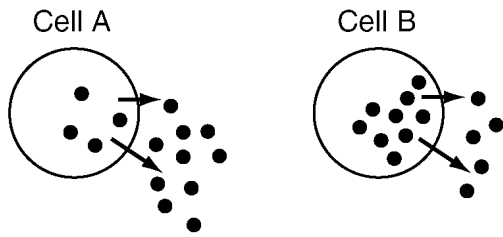
59. An investigation was set up to study the movement of water through a membrane. The results are shown in the diagram below.



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?

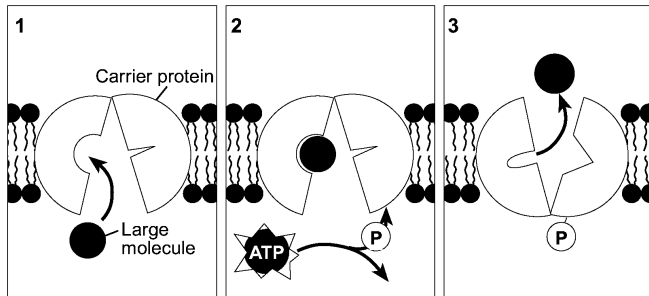
- A) The red blood cells will absorb water and increase in size.
- B) The red blood cells will lose water and decrease in size.**
- C) The red blood cells will first absorb water, then lose water and maintain their normal size.
- D) The red blood cells will first lose water, then absorb water, and finally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

60. In the diagram below, the dark dots indicate small molecules. These molecules are moving out of the cells, as indicated by the arrows. The number of dots inside and outside of the two cells represents the relative concentrations of the molecules inside and outside of the cells.



ATP is being used to move the molecules out of the cell by

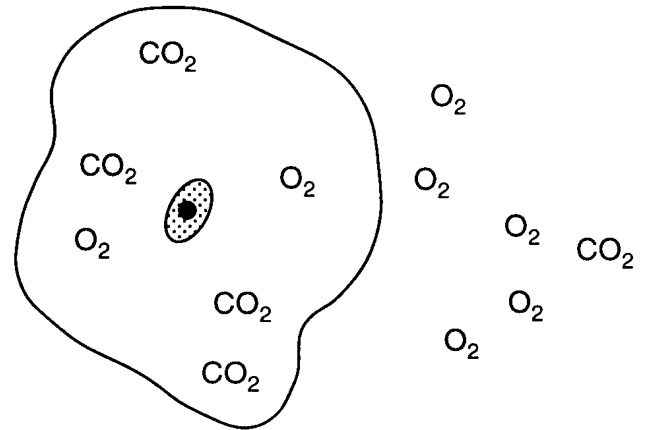
- A) cell A, only B) cell B, only
 C) both cell A and cell B D) neither cell A nor cell B
61. The diagram below represents movement of a large molecule across a membrane.



Which process is best represented in this diagram?

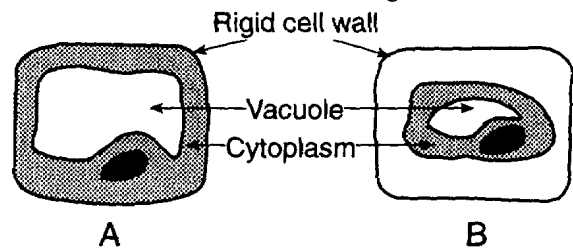
- A) active transport B) diffusion
 C) protein building D) gene manipulation

62. The diagram below represents a cell in water. Formulas of molecules that can move freely across the cell membrane are shown. Some molecules are located inside the cell and others are in the water outside the cell.



Based on the distribution of these molecules, what would most likely happen after a period of time?

- A) The concentration of O₂ will increase inside the cell.
 B) The concentration of CO₂ will remain the same inside the cell.
 C) The concentration of O₂ will remain the same outside the cell.
 D) The concentration of CO₂ will decrease outside the cell.
63. The process of active transport requires the most direct use of
- A) carbon dioxide B) amino acids
 C) ATP D) glucose
64. A biologist observed a plant cell in a drop of water as shown in diagram A. The biologist added a 10% salt solution to the slide and observed the cell as shown in diagram B.



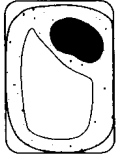
The change in appearance of the cell resulted from

- A) more salt moving out of the cell than into the cell
 B) more salt moving into the cell than out of the cell
 C) more water moving into the cell than out of the cell
 D) more water moving out of the cell than into the cell
65. An environmental change causes the contractile vacuoles of a paramecium to stop functioning, while most of the other cell structures appear to be unaffected. Which environmental change would most likely produce this result?
- A) temperature change from 20°C to 25°C
 B) pH change from 7.0 to 6.5
 C) large decrease in the amount of light
 D) slight increase in salt concentration in the environment

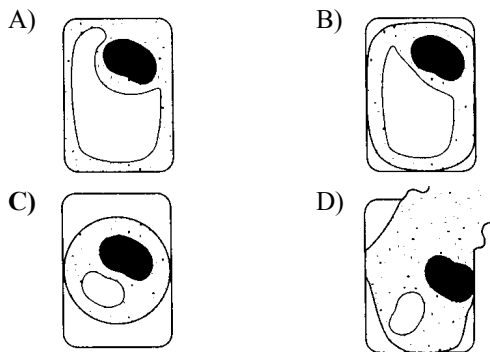
66. Cyanide is a poison that limits the ability of an animal cell to manufacture ATP. In a cell containing a small amount of cyanide, which process would be *least* affected?

- A) movement B) cell division
C) active transport D) **diffusion**

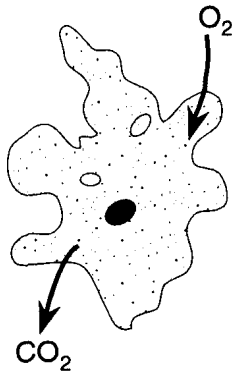
67. A student using a compound light microscope to study plant cells observed that most of the cells resembled the diagram shown below.



Which diagram best illustrates how these plant cells will appear after they are placed in a solution having a lower water concentration than the cells have?

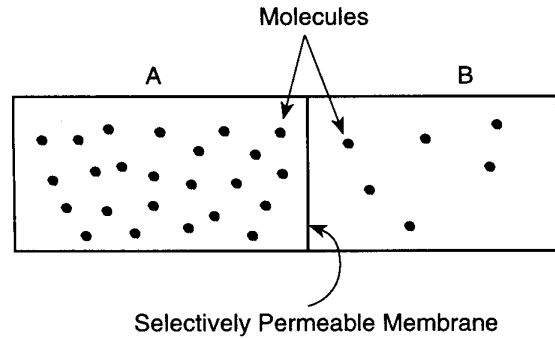


68. Which process accomplishes the movement of gases illustrated by the arrows in the diagram below?



- A) transpiration B) **diffusion**
C) phagocytosis D) osmosis

69. The diagram below shows the same type of molecules in area A and area B. With the passage of time, some molecules move from area A to area B.



This movement is the result of which process?

- A) transpiration B) respiration
C) **diffusion** D) active transport

70. Which process requires cellular energy?

- A) diffusion B) passive transport
C) **active transport** D) osmosis

71. Transport can be described as a process that

- A) **involves absorption of material into cells, followed by cyclosis**
B) results in the formation of small, soluble molecules
C) requires the formation of spindle fibers to move chromosomes
D) uses radiant energy to maintain concentration differences

72. A root hair cell may continue to absorb minerals even though the cytoplasmic concentration of these minerals is greater inside the cell than in the soil. This absorption is accomplished chiefly as a result of

- A) passive transport B) **active transport**
C) diffusion D) osmosis

Base your answers to questions 73 and 74 on the statement below.

The work of a cell is carried out by the many different types of molecules it assembles. Most of these molecules are proteins. Explain how the cell is able to make the many different proteins it needs.

73. Identify *both* the cellular structure that assembles these proteins and the kinds of molecules that are used as the building blocks of the proteins

74. Identify where in the cell the information necessary to construct a particular protein is located and the specific molecule that contains this information.

75. Base your answer to the following question on Organelles carry out specific processes involving chemical reactions. In the chart below, identify two organelles and, for each, identify a process involving chemical reactions that occurs there. Describe *one* specific way each process identified is important to the functioning of the organism.

| Organelle | Process Involving Chemical Reactions that Occur in the Organelle | How the Process is Important to the Functioning of the Organism |
|--------------------|---|--|
| (1) _____ _____ | _____ _____ _____ | _____ _____ _____ |
| (2) _____ _____ | _____ _____ _____ | _____ _____ _____ |

Answer Key
Regents Review - Cells

- | | |
|---------------------|---------------------|
| 1. <u>B</u> | 40. <u>C</u> |
| 2. <u>C</u> | 41. <u>C</u> |
| 3. <u>B</u> | 42. <u>B</u> |
| 4. <u>A</u> | 43. <u>D</u> |
| 5. <u>B</u> | 44. <u>A</u> |
| 6. <u>A</u> | 45. <u>C</u> |
| 7. <u>C</u> | 46. <u>B</u> |
| 8. <u>A</u> | 47. <u>A</u> |
| 9. <u>A</u> | 48. <u>C</u> |
| 10. <u>B</u> | 49. <u>D</u> |
| 11. <u>B</u> | 50. <u>C</u> |
| 12. <u>B</u> | 51. <u>D</u> |
| 13. <u>A</u> | 52. <u>D</u> |
| 14. <u>A</u> | 53. <u>A</u> |
| 15. <u>B</u> | 54. <u>B</u> |
| 16. <u>C</u> | 55. <u>A</u> |
| 17. <u>C</u> | 56. <u>C</u> |
| 18. <u>B</u> | 57. <u>B</u> |
| 19. <u>B</u> | 58. <u>C</u> |
| 20. <u>A</u> | 59. <u>B</u> |
| 21. <u>B</u> | 60. <u>A</u> |
| 22. <u>A</u> | 61. <u>A</u> |
| 23. <u>D</u> | 62. <u>A</u> |
| 24. <u>C</u> | 63. <u>C</u> |
| 25. <u>D</u> | 64. <u>D</u> |
| 26. <u>C</u> | 65. <u>D</u> |
| 27. <u>A</u> | 66. <u>D</u> |
| 28. <u>A</u> | 67. <u>C</u> |
| 29. <u>D</u> | 68. <u>B</u> |
| 30. <u>B</u> | 69. <u>C</u> |
| 31. <u>B</u> | 70. <u>C</u> |
| 32. <u>A</u> | 71. <u>A</u> |
| 33. <u>B</u> | 72. <u>B</u> |
| 34. <u>A</u> | |
| 35. <u>C</u> | |
| 36. <u>C</u> | |
| 37. <u>A</u> | |
| 38. <u>B</u> | |
| 39. <u>A</u> | |

73. – Ribosomes construct proteins out of amino acids. – The nucleus contains the DNA molecules where the information is found. – The information is located on a chromosome, which contains DNA.
74. – The information is in DNA molecules in the nucleus of the cell. – The nucleus contains the DNA molecules where the information is found. – The information is located on a chromosome, which contains DNA.

75.

| Organelle | Process Involving Chemical Reactions that Occur in the Organelle | How the Process is Important to the Functioning of the Organelle |
|---------------|--|--|
| mitochondrion | respiration | provides energy for the functions |
| chloroplast | photosynthesis | provides food for plants |
| ribosome | protein synthesis | makes structural molecules (or chemical messengers which control cell responses) |
| nucleus | mitosis or meiosis or DNA replication | reproduction |