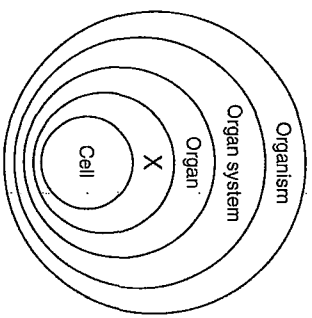


Name: \_\_\_\_\_

### Unit Exam 2 Cells, Organelles and Transport

Date: \_\_\_\_\_

1. Which sequence of terms is in the correct order from simplest to most complex?
- 1) cells → tissues → organs → organ systems
  - 2) tissues → organisms → cells → organ systems
  - 3) cells → tissues → organ systems → organs
  - 4) organs → organisms → organ systems → cells
2. The diagram below represents levels of organization in living things.

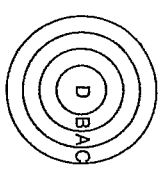
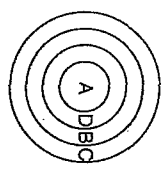
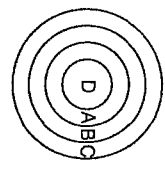
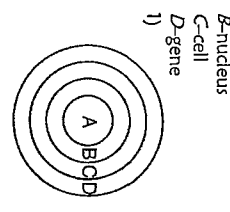


- Which term would best represent X?
- 1) human
  - 2) tissue
  - 3) stomach
  - 4) organelle

3. The cell theory states that
- 1) all cells have nuclei that contain genetic information
  - 2) living organisms are composed of cells that arise from preexisting cells
  - 3) all cells regenerate and contain the same basic structures
  - 4) organisms that lack certain organelles reproduce by binary fission
4. Which instrument was used in the 18th and 19th centuries and helped scientists develop the cell theory?
- 1) light microscope
  - 2) ultracentrifuge
  - 3) electron microscope
  - 4) microdissecting apparatus

5. An organelle that releases energy for metabolic activity in a nerve cell is the
- 1) chloroplast
  - 2) ribosome
  - 3) mitochondria
  - 4) vacuole

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



7. As a human red blood cell matures, it loses its nucleus. As a result of this loss, a mature red blood cell lacks the ability to
- 1) take in material from the blood
  - 2) release hormones to the blood
  - 3) pass through artery walls
  - 4) carry out cell division

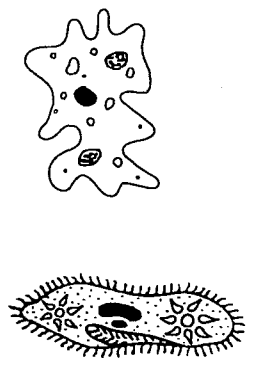
8. Which organelle is correctly paired with its specific function?
- 1) cell membrane—storage of hereditary information
  - 2) chloroplast—transport of materials
  - 3) ribosome—synthesis of proteins
  - 4) vacuole—production of ATP

9. Hereditary information is stored inside the
- 1) ribosomes, which have chromosomes that contain many genes
  - 2) ribosomes, which have genes that contain many chromosomes
  - 3) nucleus, which has chromosomes that contain many genes
  - 4) nucleus, which has genes that contain many chromosomes

### Unit Exam 2

10. 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
- 1) have a smaller demand for cell proteins than the muscle cells of nonathletes
  - 2) reproduce less frequently than the muscle cells of nonathletes
  - 3) have nuclei containing more DNA than nuclei in the muscle cells of nonathletes
  - 4) have a greater demand for energy than the muscle cells of nonathletes

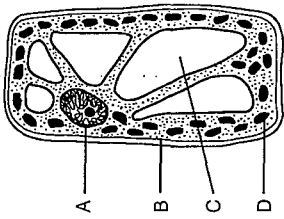
11. The diagram below represents two single-celled organisms.



- These organisms carry out the activities needed to maintain homeostasis by using specialized
- 1) tissues
  - 2) organelles
  - 3) systems
  - 4) organs

Unit Exam 2

12. Which letter indicates a cell structure that directly controls the movement of molecules into and out of the cell?

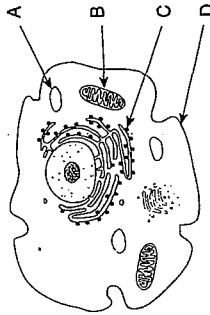


- 1) A
- 2) B
- 3) C
- 4) D

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

- 1) a nucleus
- 2) chloroplasts
- 3) a cell membrane
- 4) centrioles

14. Which letter in the diagram below indicates the structure that is most closely associated with excretion?



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

15. A structure that performs a specialized function within a cell is known as

- 1) a tissue
- 2) an organelle
- 3) an organ
- 4) a system

16. The levels of organization for structure and function in the human body from least complex to most complex are

- 1) systems → organs → tissues → cells
- 2) cells → organs → tissues → systems
- 3) tissues → systems → cells → organs
- 4) cells → tissues → organs → systems

17. The diagram below represents the fluid-mosaic model of a cell membrane.

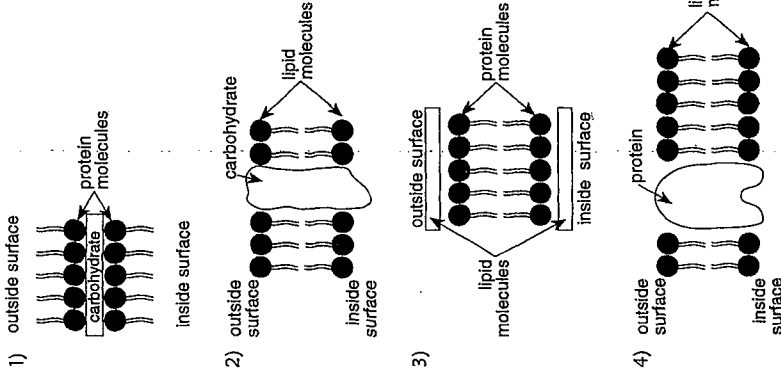


The arrow points to a component of the membrane that is best described as a

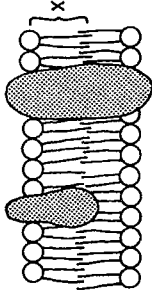
- 1) sugar floating in lipids
- 2) protein floating in lipids
- 3) lipid floating in proteins
- 4) lipid floating in sugars

Unit Exam 2

18. Which diagram best represents the fluid-mosaic model of a cell membrane?



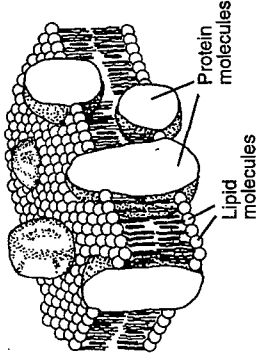
19. The diagram below represents a section of a plasma membrane.



What does structure X represent?

- 1) a protein
- 2) glucose
- 3) a lipid
- 4) glycogen

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



- 1) chloroplast
- 2) mitochondrion
- 3) plasma membrane
- 4) replicated chromosome

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

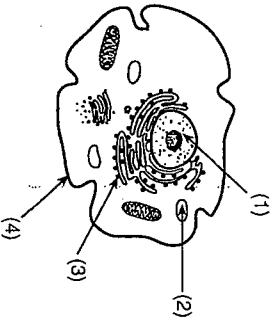
- 1) proteins and starches
- 2) carbohydrates and lipids
- 3) sugars and proteins
- 4) proteins and lipids

22. Damage to which structure will most directly disrupt water balance within a single-celled organism?

- 1) ribosome
- 2) cell membrane
- 3) nucleus
- 4) chloroplast

## Unit Exam 2

23. In the diagram below, which structure performs a function similar to a function of the human lungs?

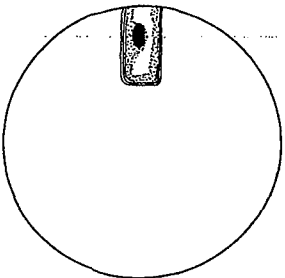


- 1) 1                      3) 3  
2) 2                      4) 4
24. Which statement regarding the functioning of the cell membrane of all organisms is *not* correct?
- 1) The cell membrane forms a boundary that separates the cellular contents from the outside environment.
  - 2) The cell membrane is capable of receiving and recognizing chemical signals.
  - 3) The cell membrane forms a barrier that keeps all substances that might harm the cell from entering the cell.
  - 4) The cell membrane controls the movement of molecules into and out of the cell.

## Unit Exam 2

- Base your answers to questions 25 and 26 on the information and diagram below and on your knowledge of biology.

The diagram below represents a specimen on a slide as seen with the low-power objective of a compound light microscope.



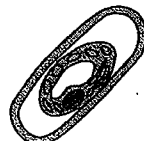
25. Which type of cell is most likely represented in this diagram?
26. Using one or more complete sentences, explain how the slide should be moved to observe the entire specimen.
27. Which substances may pass through a cell membrane by simple diffusion?
- 1) starch and protein
  - 2) protein and fat
  - 3) carbon dioxide and water
  - 4) carbon dioxide and starch
28. In a cell, the selective permeability of the cell membrane is most closely associated with the maintenance of
- |                |                 |
|----------------|-----------------|
| 1) homeostasis | 3) phagocytosis |
| 2) hydrolysis  | 4) pinocytosis  |

Unit Exam 2

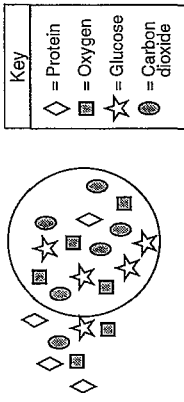
29. The diagram below represents a plant cell in tap water as seen with a compound light microscope.



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



30. The diagram below shows the relative concentration of molecules inside and outside of a cell.



Which statement best describes the general direction of diffusion across the membrane of this cell?

- 1) Glucose would diffuse into the cell.
- 2) Protein would diffuse out of the cell.
- 3) Carbon dioxide would diffuse out of the cell.
- 4) Oxygen would diffuse into the cell.

31. Molecule X moves across a cell membrane by diffusion. Which row in the chart below best indicates the relationship between the relative concentrations of molecule X and the use of ATP for diffusion?

Row	Movement of Molecule X	Use of 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

- 1) 1
- 2) 2
- 3) 3
- 4) 4

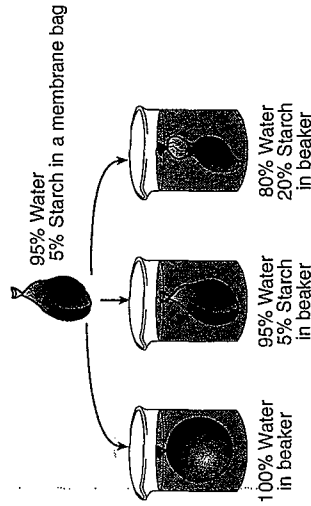
Unit Exam 2

32. 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

- 1) 1
- 2) 2
- 3) 3
- 4) 4

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

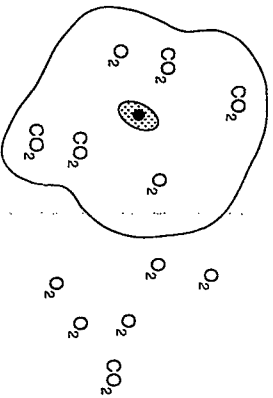


Based on these results, which statement correctly predicts what will happen to red blood cells when they are placed in a beaker containing a water solution in which the salt concentration is much higher than the salt concentration in the red blood cells?

- 1) The red blood cells will absorb water and increase in size.
- 2) The red blood cells will lose water and decrease in size.
- 3) The red blood cells will first absorb water, then lose water and maintain their normal size.
- 4) The red blood cells will first lose water, then absorb water, and finally double in size.

### Unit Exam 2

34. 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.



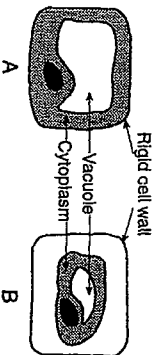
- Based on the distribution of these molecules, what would most likely happen after a period of time?
- 1) The concentration of  $O_2$  will increase inside the cell.
  - 2) The concentration of  $CO_2$  will remain the same inside the cell.
  - 3) The concentration of  $O_2$  will remain the same outside the cell.
  - 4) The concentration of  $CO_2$  will decrease outside the cell.

### Unit Exam 2

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

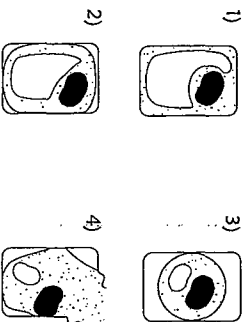


35. The process of active transport requires the most direct use of
- 1) carbon dioxide
  - 2) amino acids
  - 3) ATP
  - 4) glucose
36. A biologist observed a plant cell in a drop of water as shown in diagram A. The biologist added a 10% salt solution to the slide and observed the cell as shown in diagram B.



- The change in appearance of the cell resulted from
- 1) more salt moving out of the cell than into the cell
  - 2) more salt moving into the cell than out of the cell
  - 3) more water moving into the cell than out of the cell
  - 4) more water moving out of the cell than into the cell

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?



38. Which activity might lead to damage of a microscope and specimen?
- 1) cleaning the ocular and objectives with lens paper
  - 2) focusing with low power first before moving the high power into position
  - 3) using the coarse adjustment to focus the specimen under high power
  - 4) adjusting the diaphragm to obtain more light under high power

### Unit Exam 2

39. While viewing a specimen under high power of a compound light microscope, a student noticed that the specimen was out of focus. Which part of the microscope should the student turn to obtain a clearer image under high power?

- 1) eyepiece
- 2) coarse adjustment
- 3) fine adjustment
- 4) nosepiece

40. A slide of human blood cells was observed in focus under the low-power objective of a compound light microscope that had clean lenses. When the microscope was switched to high power, the image was dark and fuzzy. Which parts of the microscope should be used to correct this situation?

- 1) nosepiece and coarse adjustment
- 2) diaphragm and ocular
- 3) objective and fine adjustment
- 4) diaphragm and fine adjustment

41. A student observing a specimen using the low-power objective of a compound light microscope has difficulty viewing the image because the field of view is too dark. The student can correct the problem by

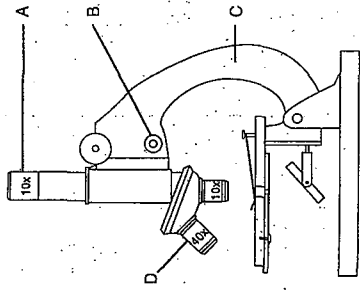
- 1) adjusting the diaphragm
- 2) using the coarse adjustment
- 3) switching to the high-power objective
- 4) cleaning the high-power objective

42. The size of the image of a cell being examined with a microscope is determined by the

- 1) light source and fine adjustment
- 2) stage and stage clips
- 3) objectives and ocular
- 4) diaphragm and coarse adjustment

### Unit Exam 2

43. Base your answer to the following question on the diagram below of a microscope and on your knowledge of biology.
44. The total magnification of an image formed by a compound light microscope is a result of the combined magnifications of the



45. The 10x objective of a compound microscope is being used to observe a specimen. If a total magnification of 150x is achieved, then the magnification of the ocular of this microscope must be

The highest possible magnification that can be obtained when using this microscope is

- 1) 40x                      3) 400x  
2) 100x                  4) 4,000x

- 1) eyepiece and diaphragm  
2) objective and mirror  
3) eyepiece and objective  
4) low-power objective and high-power objective
- 1) 10x                      3) 150x  
2) 15x                      4) 1500x

Unit Exam 2  
Answer Key  
[New Exam]

1. 1
2. 2
3. 2
4. 1
5. 3
6. 2
7. 4
8. 3
9. 3
10. 4
11. 2
12. 2
13. 2
14. 4
15. 2
16. 4
17. 2
18. 4
19. 3
20. 3
21. 4
22. 2
23. 4
24. 3
25. plant cell
26. The slide should be moved to the left.
27. 3
28. 1
29. 3
30. 3
31. 2
32. 3
33. 2
34. 1
35. 3
36. 4
37. 3
38. 3
39. 3
40. 4
41. 1
42. 3
43. 3
44. 3
45. 2

