8th Grade

Living Environment Regents Review and Living environment Lab State Lab: Diffusion Through a Membrane

Instructions: Students are required each day to work on Living Environment Regent review questions and are required to work on the State lab: Diffusion Through a Membrane

**** All work must be completed and handed in on the day school is back in session.**

Living Environment Regents Review Website: www.nysedregents.org

Click on the link provided to access the regents review questions for the January 2020 Living Environment Regents.

Click on the link provided to access the State Lab: Diffusion Through a Membrane Link

Directions:

- For all Regents Reviews Questions - Students must write each question and answer on loose-leaf paper.
- For the State Lab -Students must write each question and answer on loose-leaf paper. (including all vocabulary words)

Day 1: Regents Review pgs. 1-4 / State Lab: Define all 10 Vocabulary words

Day 2: Regents Review pgs. 5-7 / State Lab: pgs. 1-5

Day 3: Regents Review pgs. 8-11 / State Lab: pgs. 6-10

Day 4: Regents Review pgs. 12-16 / State Lab: pgs. 11-15

Day 5: Regents Review pgs. 17-22 / State Lab: pgs. 16-20

Day 6: Regents Review pgs. 23-30 / State Lab: pgs. 21-26

Living Environment Lab

State Lab: Diffusion Through a Membrane

Vocabulary:

Diffusion
Osmosis
Plasmolysis
Cell Membrane
Cell Wall
Cytoplasm
Saline
Indicator
Dilute
Digestion

Name:

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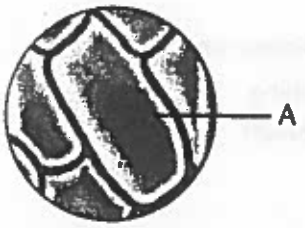
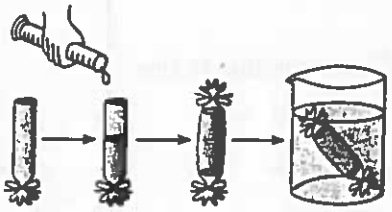
Base your answers to questions 67 through 69 on the information and diagram below and on your knowledge of biology.

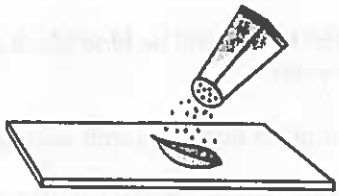
A wet mount of red onion cells as seen with a compound light microscope is shown below.



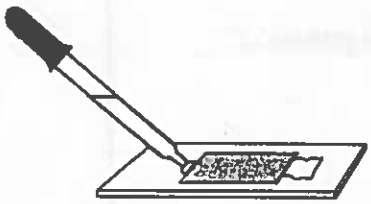
67 Which diagram best illustrates the technique that would most likely be used to add salt to these cells?



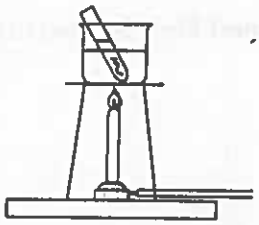
(1)



(3)



(2)



(4)

67 ☐

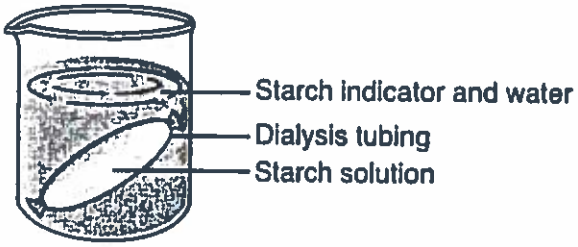
68 In the space below, sketch what cell *A* would look like after the addition of the salt. [1]

68 ☐

1

Base your answers to questions 67 and 68 on the information and diagram below and on your knowledge of biology.

Starch turns blue black in the presence of a starch indicator. Dialysis tubing tied at both ends and containing starch solution is placed in a beaker of water. Yellowish brown starch indicator is then added to the water.



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67 What will the solutions in the beaker and the tubing look like after 20 minutes?

(1) The indicator solution in the beaker will be blue black and the starch solution in the tubing will not change color.

(2) The starch solution in the tubing will be blue black and the indicator solution in the beaker will not change color.

(3) Neither the indicator solution nor the starch solution will be blue black.

(4) Both the indicator solution and the starch solution will be blue black.

67 ☐

68 This laboratory setup would most likely be used to demonstrate the process of

(1) diffusion

(2) active transport

(3) replication

(4) cellular respiration

68 ☐

69 Which substance would most likely be used to return the cells to their original condition?

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(1) starch indicator

(2) dialysis tubing

(3) glucose indicator solution

(4) distilled water

69 ☐ (2)

Base your answers to questions 76 through 78 on the diagram of a microscope below and on your knowledge of biology.

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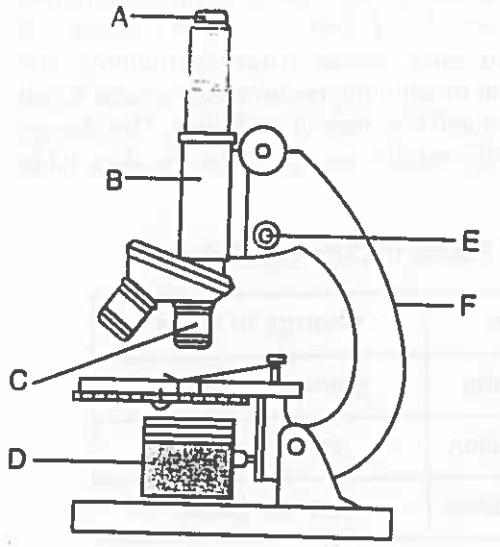

76 Information about which *two* lettered parts is needed in order to determine the total magnification of an object viewed with the microscope in the position shown? [1]

_____ and _____

76 ☐

77 Which lettered part should be used to focus the image while using high power? [1]

_____

77 ☐

78 State *two* ways the image seen through the microscope differs from the actual specimen being observed. [1]

_____ and _____

78 ☐

78 Describe what will happen to a wet-mount slide when a saltwater solution is added to them. [1]

_____

_____

78 ☐

3

Base your answers to questions 81 and 82 on the information and data table below and on your knowledge of biology.

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A student cut three identical slices from a potato. She determined the mass of each slice. She then placed them in labeled beakers and added a different solution to each beaker. After 30 minutes, she removed each potato slice from its solution, removed the excess liquid with a paper towel, and determined the mass of each slice. The change in mass was calculated and the results are shown in the data table below.

Change in Mass of Potato in Different Solutions

Beaker	Solution	Change in Mass
1	distilled water	gained 4.0 grams
2	6% salt solution	lost 0.4 gram
3	16% salt solution	lost 4.7 grams

81 Identify the process that is responsible for the change in mass of each of the three slices. [1]

_____ 81 ☐

82 Explain why the potato slice in beaker 1 increased in mass. [1]

_____

_____ 82 ☐

_____

83 Which activity might lead to damage of a microscope and specimen?

(1) cleaning the ocular and objectives with lens paper

(2) [illegible]

(3) using the coarse adjustment to focus the specimen under high power

(4) adjusting the diaphragm to obtain more light under high power 83 ☐

(4)

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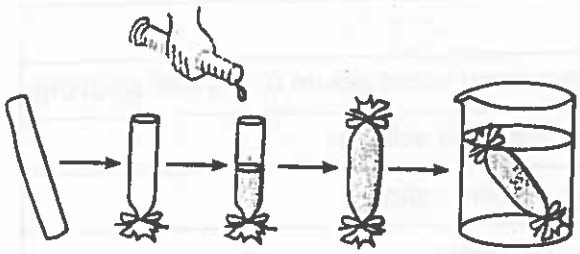
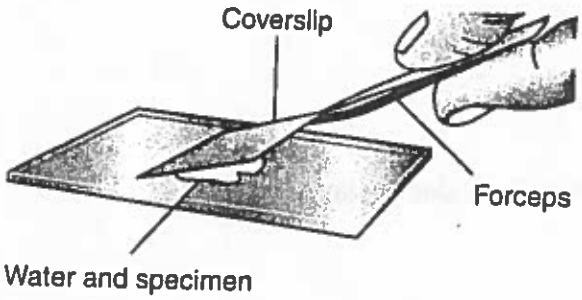
84 A solution containing both starch and glucose was placed inside the model cell represented below. The model cell was then placed in a beaker containing distilled water.



Identify *one* specific substance that should have been added to the distilled water so that observations regarding movement of starch could be made. [1]

84 ☐

75 A laboratory technique is illustrated in the diagram below.



The technique of lowering the coverslip at an angle is used to

(1) make organelles more visible

(2) reduce the formation of air bubbles

(3) make the specimen transparent

(4) reduce the size of the specimen

75 ☐

5.

Base your answers to questions 76 through 78 on the information below and on your knowledge of biology.

A student prepared four different red blood cell suspensions, as shown in the chart below.

Suspension	Contents
A	red blood cells in normal blood serum (0.7% salt solution)
B	red blood cells in 10% salt solution
C	red blood cells in distilled water
D	red blood cells in tap water

76 Which suspension would contain red blood cells that would appear wrinkled and reduced in volume?

(1) *A*

(2) *B*

(3) *C*

(4) *D*

76 ☐

77 The change in red blood cell volume is principally due to the movement of

(1) serum

(2) oxygen

(3) water

(4) salt

77 ☐

78 Which process is most likely involved in the change in red blood cell volume?

(1) active transport

(2) evaporation

(3) replication

(4) diffusion

78 ☐

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6

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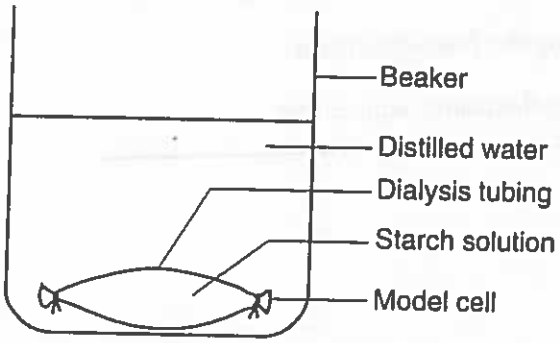
76 Glucose indicator was added to a beaker of an unknown liquid. Starch indicator was added to a different beaker containing the same unknown liquid. The color of the indicator solutions before they were added to the beakers and the color of the contents of the beakers after adding the indicator solution are recorded in the chart below.

Beaker	Solution	Color of Indicator Solution Before Adding to Beaker	Color of Contents of Beaker After Adding Indicator Solution
1	unknown liquid + glucose indicator	blue	blue (after heating)
2	unknown liquid + starch indicator	amber	blue black

Which carbohydrate is present in the unknown liquid? Support your answer. [1]

76 ☐

77 A laboratory setup of a model cell is shown in the diagram below.



Which observation would most likely be made 24 hours later?

(1) The contents of the model cell have changed color.

(2) The diameter of the model cell has increased.

(3) The model cell has become smaller.

(4) The amount of distilled water in the beaker has increased.

77 ☐

Base your answers to questions 78 and 79 on the diagram below and on your knowledge of biology. The diagram illustrates what happens when a particular solution is added to a wet-mount slide containing red onion cells being observed using a compound light microscope.

78 Identify a process that caused the change in the cells. [1]

78 ☐

79 To observe the cells on this slide it is best to start out using the

(1) high-power objective and focus using the coarse adjustment, only

(2) low-power objective and focus using the fine adjustment, only

(3) high-power objective and focus using the fine adjustment

(4) low-power objective and focus using the coarse adjustment

79 ☐

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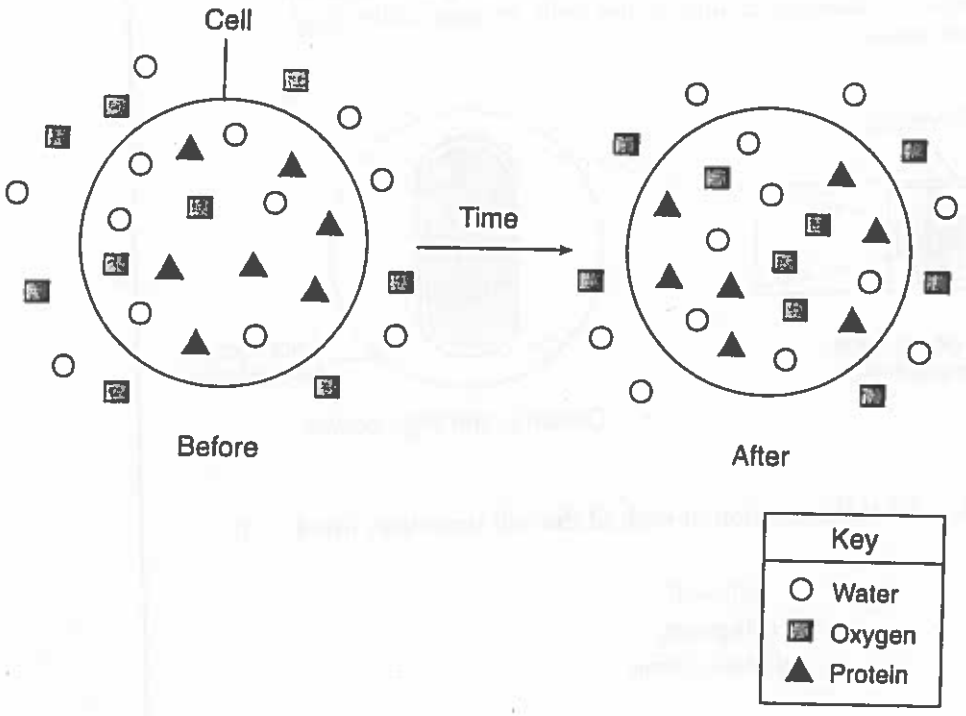
80 The diagram below represents the distribution of some molecules inside and outside of a cell over time.



Which factor prevented the protein molecules (▲) from moving out of the cell?

(1) temperature

(2) pH

(3) molecule size

(4) molecule concentration

80 ☐

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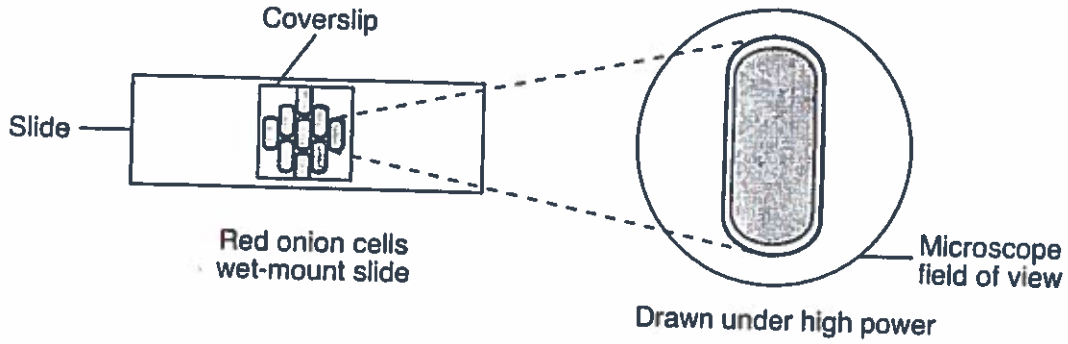
9

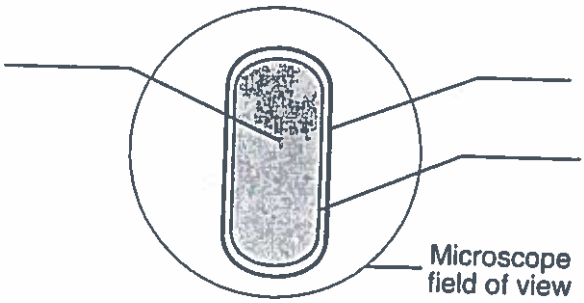
Base your answers to questions 72 through 74 on the information below and on your knowledge of biology.

A wet-mount slide of red onion cells is studied using a compound light microscope. A drawing of one of the cells as seen under high power is shown below.



72 On the diagram below, label the location of each of the cell structures listed. [1]

cell wall
cytoplasm
cell membrane



72 ☐

73 Describe the proper way to add a saltwater solution to the cells without removing the coverslip. [1]

_____

_____

_____

73 ☐

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10

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

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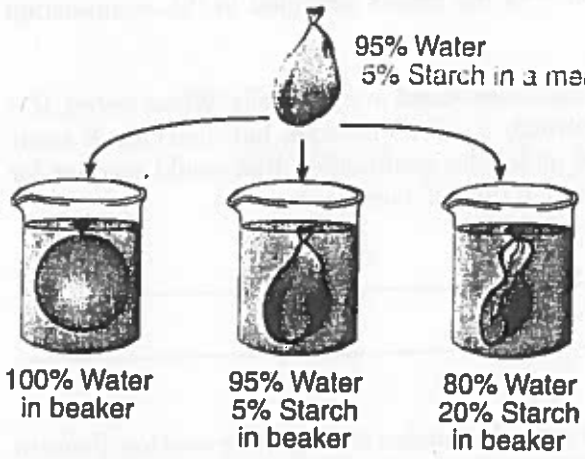

Based on these results, which statement correctly predicts what will happen to red blood cells when they are placed in a beaker containing a water solution in which the salt concentration is much higher than the salt concentration in the red blood cells?

(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.

67 ☐

74 In the space below, sketch how the cell would look after the saltwater solution is added to it. [1]

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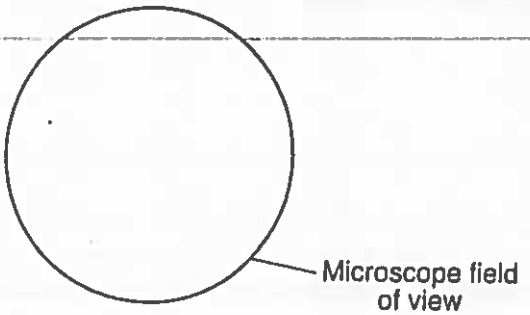

74 ☐

Part D

Answer all questions in this part. [13]

Directions (62–72): Record your answers in the spaces provided in this examination booklet.

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62 Molecules *A* and *B* are both organic molecules found in many cells. When tested, it is found that molecule *A* cannot pass through a cell membrane, but molecule *B* easily passes through. State one way the two molecules could differ, that would account for the difference in the ability to pass through the cell membrane. [1]

_____

_____

62 ☐

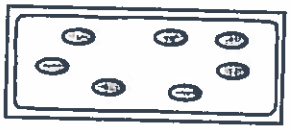
63 If vegetables become wilted, they can often be made crisp again by soaking them in water. However, they may lose a few nutrients during this process. Using the concept of diffusion and concentration, state why some nutrients would leave the plant cell. [1]

_____

_____

63 ☐

64 *Elodea* is a plant that lives in freshwater. The diagram below represents one *Elodea* leaf cell in its normal freshwater environment.



Elodea cell in freshwater

Predict how the contents of the *Elodea* cell would change if the cell was placed in saltwater for several minutes by completing the diagram, "*Elodea* cell in saltwater" below. Label the location of the cell membrane. [2]

Elodea cell in saltwater

64 ☐

12

73 The photos below show two red onion cells viewed with the high power of a compound light microscope. Describe the steps that could be used to make cell *A* resemble cell *B* using a piece of paper towel and an eyedropper or a pipette *without removing the coverslip*. [3]

Cell A

Cell B

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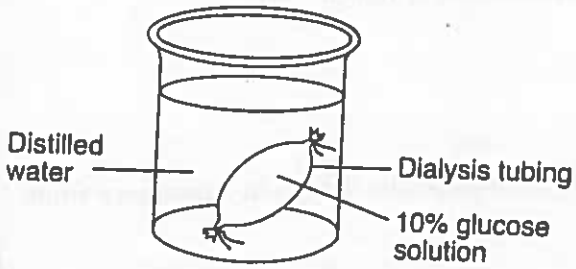
73 ☐

67 A laboratory setup using an artificial cell made from dialysis tubing is shown in the diagram below.



Identify the process that would most likely be responsible for the movement of glucose from inside the artificial cell to the solution outside of the cell. [1]

67 ☐

[OVER]

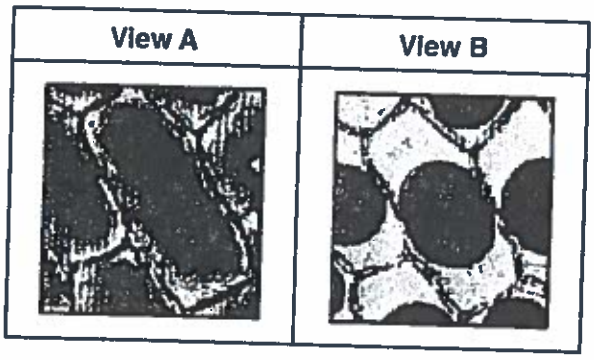
Part D

Answer all questions in this part. [13]

Directions (62–73): For those questions that are followed by four choices, circle the *number* of the choice that best completes the statement or answers the question. For all other questions in this part, follow the directions given in the question.

Base your answers to questions 62 through 64 on the information and diagram below.

A student prepared a wet-mount slide of red onion skin and observed it under high power of a compound light microscope (view *A*). After adding a substance to the slide and waiting one minute, the student observed that there were changes in the cells (view *B*).



62 Identify *one* substance that could have been added to the cells on the slide in view *A* that would make them resemble the cells observed in view *B*. [1]

_____

63 Identify the specific substance that diffused to cause the change in appearance from view *A* to view *B*. [1]

_____

64 In the box below, sketch how view *B* would appear when viewed under lower power of the same compound light microscope. [1]

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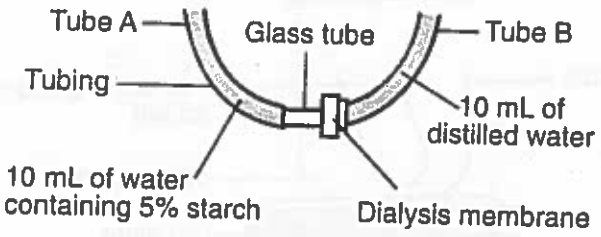
62 ☐

63 ☐

64 ☐

72 The diagram below represents a laboratory setup used by a student during an investigation of diffusion.



Which statement best explains why the liquid in tube *A* will rise over a period of time?

(1) The starch concentrations are equal on both sides of the membrane.

(2) The water will pass from a region of lower starch concentration to one of higher starch concentration.

(3) Water and starch volumes are the same in both tubes *A* and *B*.

(4) The fluids in both tubes *A* and *B* will change from a higher temperature to a lower temperature.

72 ☐

73 A red onion cell has undergone a change, as represented in the diagram below.

This change is most likely due to the cell being placed in

(1) distilled water

(2) light

(3) salt water

(4) darkness

73 ☐

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Base your answer to question 62 on the information and diagram below and on your knowledge of biology.

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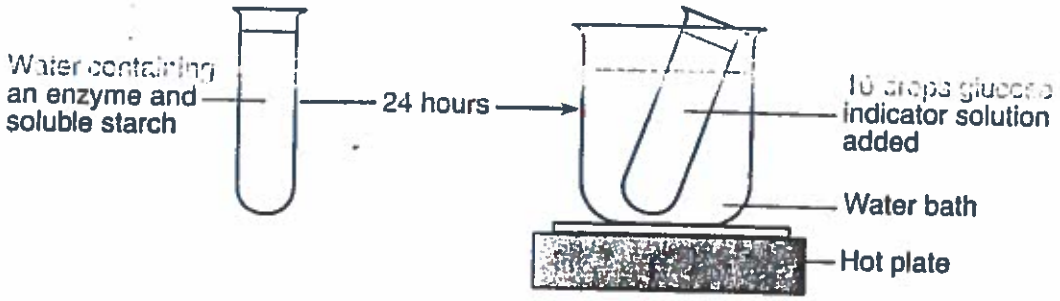
An enzyme and soluble starch were added to a test tube of water and kept at room temperature for 24 hours. Then, 10 drops of glucose indicator solution were added to the test tube, and the test tube was heated in a hot water bath for 2 minutes.



62 The test was performed in order to

(1) measure the quantity of fat that is converted to starch

(2) determine if digestion took place

(3) evaporate the water from the test tube

(4) cause the enzyme to bond to the water

62 ☐

Base your answers to questions 72 and 73 on the information below and on your knowledge of biology.

Students prepared four models of cells by using dialysis tubing containing the same blue solution. Each of the model cells originally weighed 10 grams. They then placed each model cell in a beaker containing a different concentration of water. After 24 hours, they recorded the mass of the model cells as shown in the data table below.

Data Table

Concentration of Water Surrounding the Model Cell	Mass of Model Cell
100%	12 grams
90%	11 grams
80%	10 grams
70%	9 grams

72 Why did the model cell that was placed in 100% water increase in mass? [1]

72 ☐

73 What was the concentration of water in the original blue solution? State evidence in support of your answer. [1]

16

74 A laboratory setup for a demonstration is represented in the diagram below.

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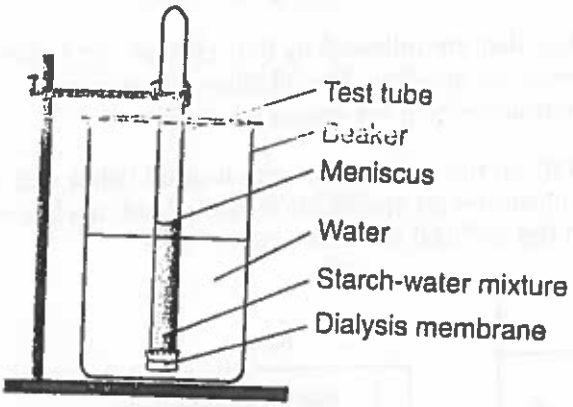
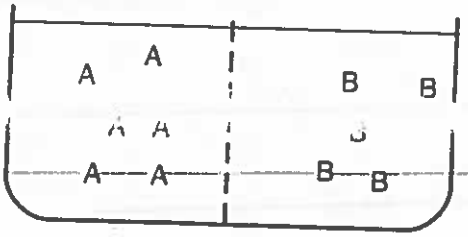


Describe how an indicator can be used to determine if starch diffuses through the membrane into the beaker. In your answer, be sure to include:

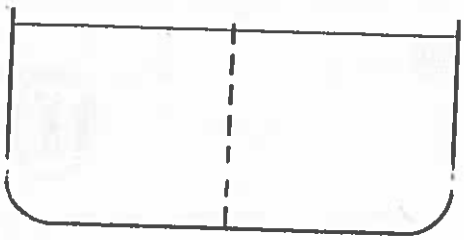
- the procedure used [1]
- how to interpret the results [1]

74

66 The diagram below represents a container of water and two different kinds of molecules, *A* and *B*, separated into two chambers by a membrane through which only water and molecule *A* can pass.



On the diagram of the container below, indicate the distribution of molecules *A* and *B* after the net movement of these molecules stops. [2]



66

Part D

Answer all questions in this part. [13]

Directions (60–69): For those questions that are followed by four choices, circle the *number* of the choice that best completes the statement or answers the question. For all other questions in this part, follow the directions given in the questions and record your answers in the spaces provided.

Base your answers to questions 60 and 61 on the information and diagram below and on your knowledge of biology. The diagram illustrates an investigation carried out in a laboratory activity on diffusion. The beaker and the artificial cell also contain water.

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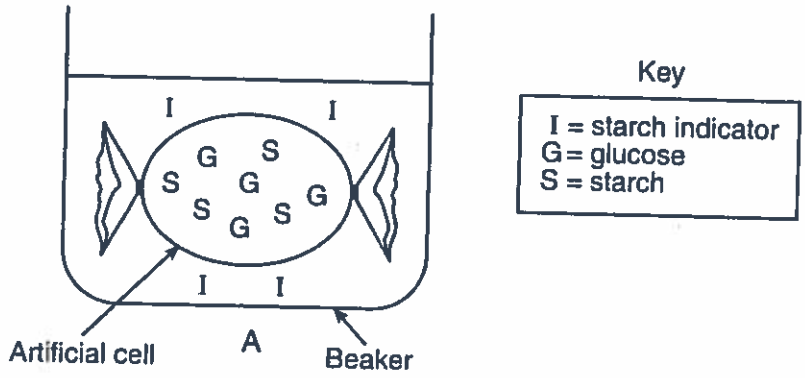
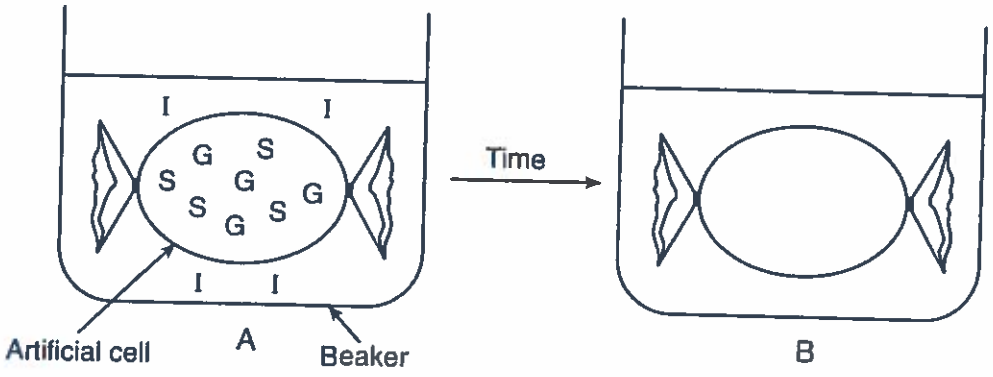


60 Predict what would happen over time by showing the location of molecules *I*, *G*, and *S* in diagram *B* below. [3]

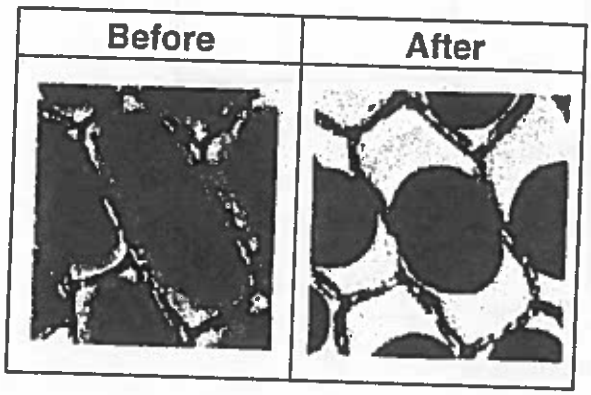


60 ☐

61 State what is observed when there is a positive test for starch using the starch indicator. [1]

61 ☐

Base your answers to questions 74 and 75 on the information and diagram below and on your knowledge of biology. The diagram represents some cells on a microscope slide before and after a substance was added to the slide.



74 Identify a substance that was most likely added to the slide to cause the change observed. [1]

_____

75 Describe a procedure that could be used to add this substance to the cells on the slide without removing the coverslip. [1]

_____

_____

_____

_____

76 In the *Diffusion Through a Membrane* lab, the model cell membranes allowed certain substances to pass through based on which characteristic of the diffusing substance?

(1) size

(2) shape

(3) color

(4) temperature

_____

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74 ☐

75 ☐

76 ☐

Base your answers to questions 71 and 72 on the diagram below and on your knowledge of biology. The diagram shows the changes that occurred in a beaker after 30 minutes. The beaker contained water, food coloring, and a bag made from dialysis tubing membrane.

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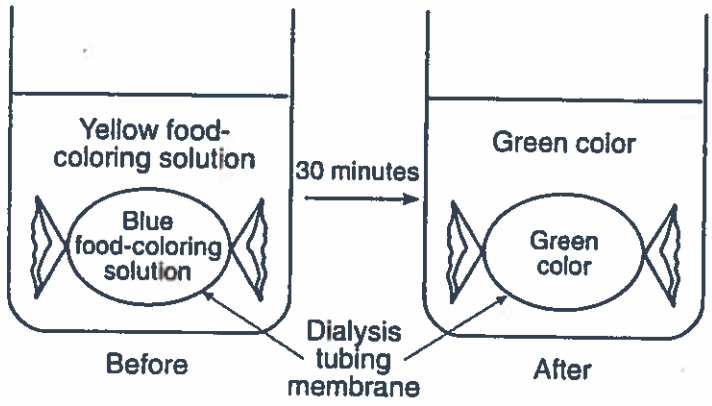

71 When the colors yellow and blue are combined, they produce a green color. Which statement most likely describes the relative sizes of the yellow and blue food-coloring molecules in the diagram?

(1) The yellow food-coloring molecules are small, while the blue food-coloring molecules are large.

(2) The yellow food-coloring molecules are large, while the blue food-coloring molecules are small.

(3) Both the yellow food-coloring molecules and the blue food-coloring molecules are large.

(4) Both the yellow food-coloring molecules and the blue food-coloring molecules are small.

71 ☐

72 Which statement best explains the changes shown?

(1) Molecular movement was aided by the presence of specific carbohydrate molecules on the surface of the membrane.

(2) Molecular movement was aided by the presence of specific enzyme molecules on the surface of the membrane.

(3) Molecules moved across the membrane without additional energy being supplied.

(4) Molecules moved across the membrane only when additional energy was supplied.

72 ☐

20

73 Cell *A* shown below is a typical red onion cell in water on a slide viewed with a compound light microscope.

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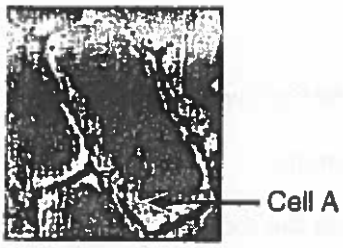

Draw a diagram of how cell *A* would most likely look after salt water has been added to the slide and label the cell membrane in your diagram. [2]

73 ☐

73 A student prepared a wet-mount slide of some red onion cells and then added some salt water to the slide. The student observed the slide using a compound light microscope. Diagram *A* is typical of what the student observed after adding salt water.

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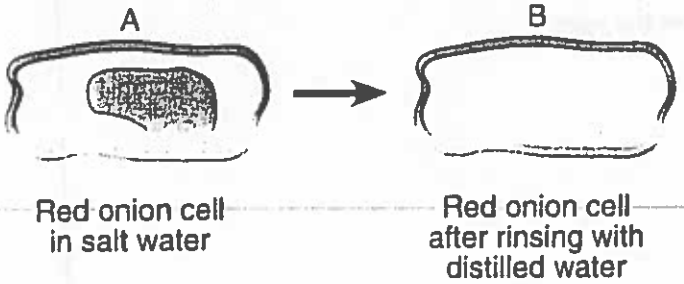
Complete diagram *B* to show how the contents of the red onion cells should appear if the cell were then rinsed with distilled water for several minutes. [1]



73 ☐

21

75 A student fills a dialysis membrane bag with a mixture of red dye, yellow dye, and water. He soaks the bag in pure water for 24 hours and then observes that the water outside the bag turns yellow. Which statement best explains the results of this experiment?

(1) Water diffused into the membrane bag.

(2) The dialysis membrane actively transported yellow dye molecules.

(3) Only red dye diffused through the membrane.

(4) The yellow dye molecules are smaller than the red dye molecules.

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75 ☐

67 State *one* factor that influences which molecules can pass through the cell membrane of a human cell. [1]

_____

_____

67 ☐

68 An indicator for a protein is added to a solution that contains protein and to a solution that does *not* contain protein. State *one* way, other than the presence or absence of protein, that the two solutions may differ after the indicator has been added to both. [1]

_____

_____

68 ☐

68 If frog eggs taken from a freshwater pond are placed in a saltwater aquarium, what will most likely happen?

(1) Water will leave the eggs.

(2) Salt will leave the eggs.

(3) Water will neither enter nor leave the eggs.

(4) The eggs will burst.

☐

22

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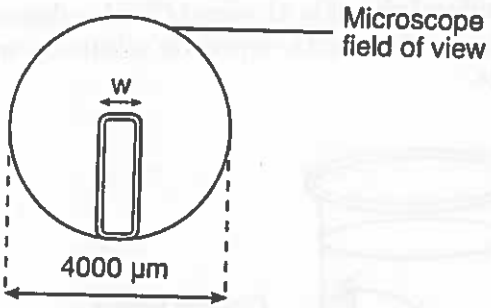
79 A plant cell in a microscopic field of view is represented below.



The width (w) of this plant cell is closest to

(1) 200 µm

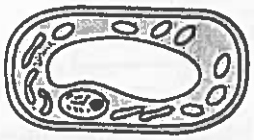
(2) 800 µm

(3) 1200 µm

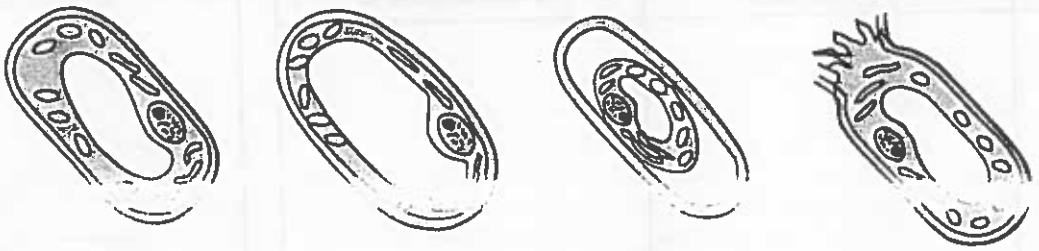
(4) 1600 µm

79 ☐

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



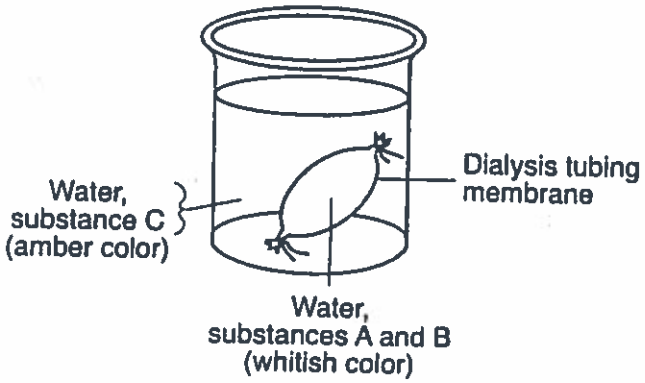
Which diagram best represents the appearance of the cell after it has been placed in a 15% salt solution for two minutes?



80 ☐

Base your answers to questions 72 and 73 on the information and table below and on your knowledge of biology.

A model of a cell is prepared and placed in a beaker of fluid as shown in the diagram below. The letters *A*, *B*, and *C* represent substances in the initial experimental setup.



The table below summarizes the content and appearance of the cell model and beaker after 20 minutes.

Results After 20 Minutes

	Outside of Cell Model	Inside of Cell Model
Substances	water, A, C	water, A, B, C
Color	amber	blue black

72 Complete the table below to summarize a change in location of substance *C* in the experimental setup. [3]

Name of Substance C	Direction of Movement of Substance C	Reason for the Movement of Substance C

72 ☐

73 Identify substance *B* and explain why it did *not* move out of the model cell. [2]

Substance: _____

_____

_____

_____

73 ☐ 24

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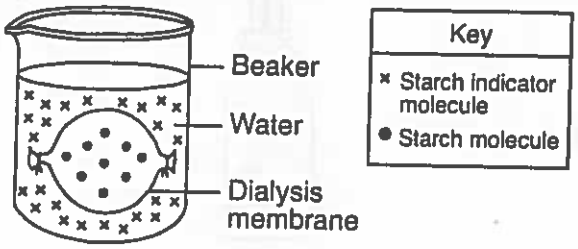
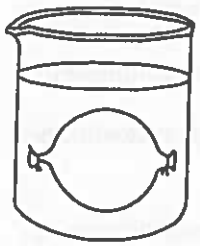
Base your answers to questions 76 and 77 on the experimental setup shown below.



76 On the diagram below, draw in the expected locations of the molecules after a period of one hour. [1]



77 When starch indicator is used, what observation would indicate the presence of starch? [1]

_____

_____

_____

78 State *one* reason why some molecules can pass through a certain membrane, but other molecules can *not*. [1]

_____

_____

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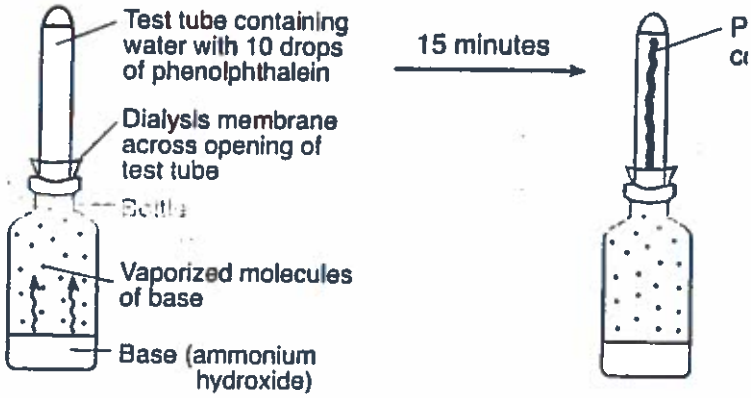
76 ☐

77 ☐

78 ☐

25

50 Phenolphthalein is a chemical that turns pink in the presence of a ba
up the demonstration shown in the diagram below.



The appearance of the pink color was due to the movement of

(1) phenolphthalein molecules from low concentration to high conce

(2) base molecules from high concentration through the membrane to l

(3) water molecules through the membrane from high concentratio
tration

(4) phenolphthalein molecules in the water from high concentration to l

26.