The University of the State of New York REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Friday, January 25, 2008 — 9:15 a.m. to 12:15 p.m., only

Student Name _____

School Name _____

Print your name and the name of your school on the lines above. Then turn to the last page of this booklet, which is the answer sheet for Part A and Part B–1. Fold the last page along the perforations and, slowly and carefully, tear off the answer sheet. Then fill in the heading of your answer sheet.

You are to answer <u>all</u> questions in all parts of this examination. Write your answers to the Part A and Part B–1 multiple-choice questions on the separate answer sheet. Write your answers for the questions in Parts B–2, C, and D directly in this examination booklet. All answers should be written in pen, except for graphs and drawings which should be done in pencil. You may use scrap paper to work out the answers to the questions, but be sure to record all your answers on the answer sheet and in this examination booklet.

When you have completed the examination, you must sign the statement printed on your separate answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet cannot be accepted if you fail to sign this declaration.

The use of any communications device is strictly prohibited when taking this examination. If you use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part A

Answer all questions in this part. [30]

Directions (1–30): For *each* statement or question, write on your separate answer sheet the *number* of the word or expression that, of those given, best completes the statement or answers the question.

- 1 The transfer of genes from parents to their offspring is known as
 - (1) differentiation (3) immunity
 - (2) heredity (4) evolution
- 2 Damage to which structure will most directly disrupt water balance within a single-celled organism?
 - (1) ribosome (3) nucleus
 - (2) cell membrane (4) chloroplast
- 3 Two primary agents of cellular communication are
 - (1) chemicals made by blood cells and simple sugars
 - (2) hormones and carbohydrates
 - (3) enzymes and starches
 - (4) hormones and chemicals made by nerve cells
- 4 The function of most proteins depends primarily on the
 - (1) type and order of amino acids
 - (2) environment of the organism
 - (3) availability of starch molecules
 - (4) nutritional habits of the organism
- 5 Which procedure would most likely provide valid results in a test to determine if drug *A* would be effective in treating cancer in white mice?
 - (1) injecting 1 mL of drug *A* into 100 white mice with cancer
 - (2) injecting 1 mL of drug A into 100 white mice with cancer and 0.5 mL of drug X into 100 white mice without cancer
 - (3) injecting 1 mL of drug *A* into 100 white mice with cancer and 0.5 mL of drug *X* into another group of 100 white mice with cancer
 - (4) injecting 1 mL of drug *A* into 100 white mice with cancer and 1 mL of distilled water into another group of 100 white mice with cancer

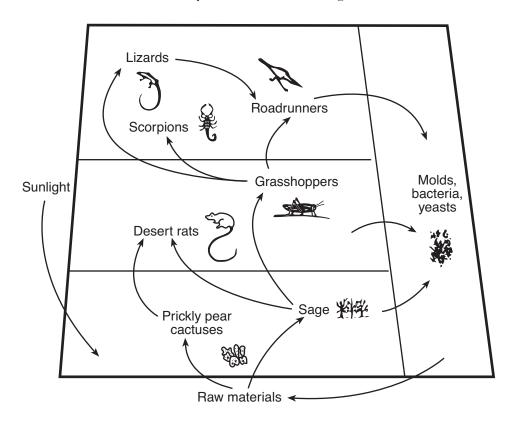
6 The table below provides some information concerning organelles and organs.

Function	Organelle	Organ
gas exchange	cell membrane	lung
nutrition	food vacuole	stomach

Based on this information, which statement accurately compares organelles to organs?

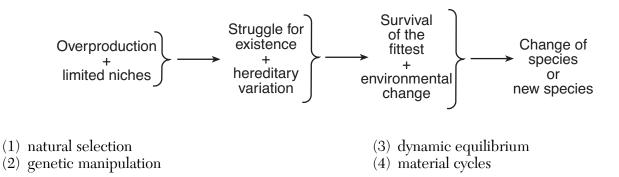
- (1) Functions are carried out more efficiently by organs than by organelles.
- (2) Organs maintain homeostasis while organelles do not.
- (3) Organelles carry out functions similar to those of organs.
- (4) Organelles function in multicellular organisms while organs function in single-celled organisms.
- 7 In order to produce the first white marigold flower, growers began with the lightest yellowflowered marigold plants. After crossing them, these plants produced seeds, which were planted, and only the offspring with very lightyellow flowers were used to produce the next generation. Repeating this process over many years, growers finally produced a marigold flower that is considered the first white variety of its species. This procedure is known as
 - (1) differentiation (3) gene insertion
 - (2) cloning (4) selective breeding
- 8 Chromosomes can be described as
 - (1) large molecules that have only one function
 - (2) folded chains of bonded glucose molecules
 - (3) reproductive cells composed of molecular bases
 - (4) coiled strands of genetic material

9 Some interactions in a desert community are shown in the diagram below.



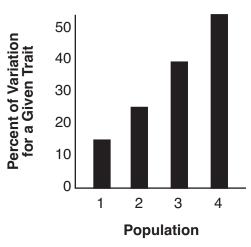
Which statement is a valid inference based on the diagram?

- (1) Certain organisms may compete for vital resources.
- (2) All these organisms rely on energy from decomposers.
- (3) Organisms synthesize energy.
- (4) All organisms occupy the same niche.
- 10 Which concept is best illustrated in the flowchart below?



- 11 The headline "Improved Soybeans Produce Healthier Vegetable Oils" accompanies an article describing how a biotechnology company controls the types of lipids (fats) present in soybeans. The improved soybeans are most likely being developed by the process of
 - (1) natural selection
 - (2) asexual reproduction
 - (3) genetic engineering
 - (4) habitat modification
- 12 Which statement indicates one difference between the gene that codes for insulin and the gene that codes for testosterone in humans?
 - (1) The gene for insulin is replicated in vacuoles, while the gene for testosterone is replicated in mitochondria.
 - (2) The gene for insulin has a different sequence of molecular bases than the gene for testosterone.
 - (3) The gene for insulin is turned on in liver cells, but the gene for testosterone is not.
 - (4) The gene for insulin is a sequence of five different molecular bases while the gene for testosterone is a sequence of only four different molecular bases.
- 13 Cells that develop from a single zygote all contain identical DNA molecules. However, some of these cells will develop differently because
 - (1) different groups of cells containing the DNA may be exposed to different environmental conditions
 - (2) only the DNA in certain cells will replicate
 - (3) some of the DNA in some of the cells will be removed by chemical reactions
 - (4) DNA is functional in only 10% of the cells of the body
- 14 Which sequence represents the correct order of processes that result in the formation and development of an embryo?
 - (1) meiosis \rightarrow fertilization \rightarrow mitosis
 - (2) mitosis \rightarrow fertilization \rightarrow meiosis
 - (3) fertilization \rightarrow meiosis \rightarrow mitosis
 - (4) fertilization \rightarrow mitosis \rightarrow meiosis

15 The graph below shows the percent of variation for a given trait in four different populations of the same species. The populations inhabit similar environments.



In which population will the greatest number of individuals most likely survive if a significant environmental change related to this trait occurs?

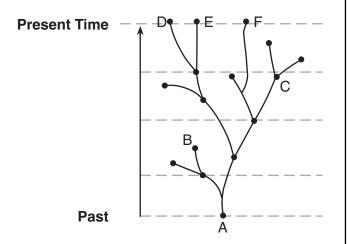
(1)	1	(3)	3
(2)	2	(4)	4

- 16 The sequence of events occurring in the life cycle of a bacterium is listed below.
 - (A) The bacterium copies its single chromosome.
 - (B) The copies of the chromosome attach to the cell membrane of the bacterium.
 - (C) As the cell grows, the two copies of the chromosome separate.
 - (D) The cell is separated by a wall into equal halves.
 - (E) Each new cell has one copy of the chromosome.

This sequence most closely resembles the process of

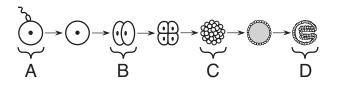
- (1) recombination
- (2) zygote formation
- (3) mitotic cell division
- (4) meiotic cell division

17 The diagram below illustrates possible evolutionary pathways of some species.



Which statement is a valid inference based on the information in the diagram?

- (1) Species *A* is the common ancestor of all life on Earth.
- (2) Species D is more closely related to species E than to species F.
- (3) Species \overline{B} is the ancestor of species *F*.
- (4) Species *C* is the ancestor of species that exist at the present time.
- 18 The diagram below represents stages in the processes of reproduction and development in an animal.

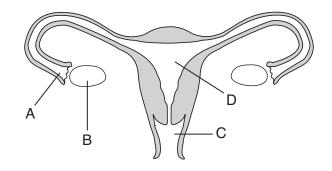


Cells containing only half of the genetic information characteristic of this species are found at

(1)	A	(3)	C
(2)	В	(4)	D

- 19 Which hormones most directly influence the uterus during pregnancy?
 - (1) testosterone and insulin
 - (2) progesterone and testosterone
 - (3) estrogen and insulin
 - (4) progesterone and estrogen

20 The diagram below represents the human female reproductive system.



Exposure to radiation or certain chemicals could alter the genetic information in the gametes that form in structure

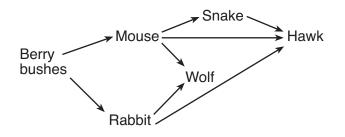
(1) A	(3) C
(2) B	(4) D

- 21 All life depends on the availability of usable energy. This energy is released when
 - (1) organisms convert solar energy into the chemical energy found in food molecules
 - (2) respiration occurs in the cells of producers and high-energy molecules enter the atmosphere
 - (3) cells carry out the process of respiration
 - (4) animal cells synthesize starch and carbon dioxide
- 22 The sweet taste of freshly picked corn is due to the high sugar content in the kernels. Enzyme action converts about 50% of the sugar to starch within one day after picking. To preserve its sweetness, the freshly picked corn is immersed in boiling water for a few minutes, and then cooled.

Which statement most likely explains why the boiled corn kernels remain sweet?

- (1) Boiling destroys sugar molecules so they cannot be converted to starch.
- (2) Boiling kills a fungus on the corn that is needed to convert sugar to starch.
- (3) Boiling activates the enzyme that converts amino acids to sugar.
- (4) Boiling deactivates the enzyme responsible for converting sugar to starch.

- 23 One biotic factor that affects consumers in an ocean ecosystem is
 - (1) number of autotrophs
 - (2) temperature variation
 - (3) salt content
 - (4) pH of water
- 24 Which component of a stable ecosystem can *not* be recycled?
 - (1) oxygen (3) energy
 - (2) water (4) nitrogen
- 25 A food web is represented in the diagram below.



Which population in this food web would most likely be *negatively* affected by an increase in the mouse population?

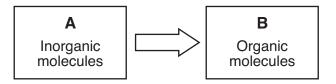
(1)	snake	(3)	wolf
(2)	rabbit	(4)	hawk

- 26 Years after the lava from an erupting volcano destroyed an area, grasses started to grow in that area. The grasses were gradually replaced by shrubs, evergreen trees, and finally, by a forest that remained for several hundred years. This entire process is an example of
 - (1) feedback
 - (2) ecological succession
 - (3) plant preservation
 - (4) deforestation

27 Increased industrialization will most likely

- (1) decrease available habitats
- (2) increase environmental carrying capacity for native species
- (3) increase the stability of ecosystems
- (4) decrease global warming

- 28 A five-year study was carried out on a population of algae in a lake. The study found that the algae population was steadily decreasing in size. Over the five-year period this decrease most likely led to
 - (1) a decrease in the amount of nitrogen released into the atmosphere
 - (2) an increase in the amount of oxygen present in the lake
 - (3) an increase in the amount of water vapor present in the atmosphere
 - (4) a decrease in the amount of oxygen released into the lake
- 29 Which result of technological advancement has a positive effect on the environment?
 - (1) development of new models of computers each year, with disposal of the old computers in landfills
 - (2) development of new models of cars that travel fewer miles per gallon of gasoline
 - (3) development of equipment that uses solar energy to charge batteries
 - (4) development of equipment to speed up the process of cutting down trees
- 30 The diagram below represents a biological process.



Which set of molecules is best represented by letters A and B?

- (1) A: oxygen and water B: glucose
- (2) A: glucose B: carbon dioxide and water
- (3) A: carbon dioxide and water B: glucose
- (4) A: glucose B: oxygen and water

Part B-1

Answer all questions in this part. [12]

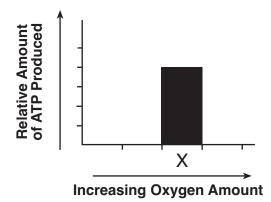
Directions (31–42): For *each* statement or question, write on the separate answer sheet the *number* of the word or expression that, of those given, best completes the statement or answers the question.

31 A biologist used the Internet to contact scientists around the world to obtain information about declining amphibian populations. He was able to gather data on 936 populations of amphibians, consisting of 157 species from 37 countries. Results showed that the overall numbers of amphibians dropped 15% a year from 1960 to 1966 and continued to decline about 2% a year through 1997.

What is the importance of collecting an extensive amount of data such as this?

- (1) Researchers will now be certain that the decline in the amphibian populations is due to pesticides.
- (2) The data collected will prove that all animal populations around the world are threatened.
- (3) Results from all parts of the world will be found to be identical.
- (4) The quantity of data will lead to a better understanding of the extent of the problem.
- 32 The first trial of a controlled experiment allows a scientist to isolate and test
 - (1) a logical conclusion
 - (2) a variety of information
 - (3) a single variable
 - (4) several variables

33 A student studied how the amount of oxygen affects ATP production in muscle cells. The data for amount X are shown in the graph below.



If the student supplies the muscle cells with *less* oxygen in a second trial of the investigation, a bar placed on the graph to represent the results of this trial would most likely be

- (1) shorter than bar *X* and placed to the left of bar *X*
- (2) shorter than bar *X* and placed to the right of bar *X*
- (3) taller than bar *X* and placed to the left of bar *X*
- (4) taller than bar *X* and placed to the right of bar *X*

34 Some steps involved in DNA replication and protein synthesis are summarized in the table below.

Step A	DNA is copied and each new cell gets a full copy.
Step B	Information copied from DNA moves to the cytoplasm.
Step C	Proteins are assembled at the ribosomes.
Step D	Proteins fold and begin function- ing.

In which step would a mutation lead directly to the formation of an altered gene?

(1)	A	(3) C
(2)	В	(4) D

35 Species *A*, *B*, *C*, and *D* are all different heterotrophs involved in the same food chain in an ecosystem. The chart below shows the population of each species at the same time on a summer day.

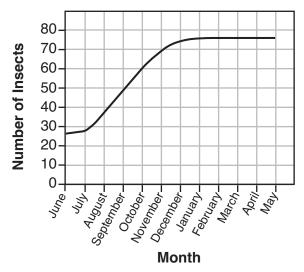
Species	Population
А	847
В	116
С	85
D	6

Which statement best describes one of these species of heterotrophs?

- (1) Species *A* is the most numerous because it can make its own food.
- (2) Species B probably feeds on species D.
- (3) Species \vec{C} and \vec{B} interbred to produce species A.
- (4) Species *D* is most likely the top predator in the food chain.

36 Students conducting a study on an insect population placed 25 insects of the same size in a box. The amount of food, water, and shelter available to the insects was kept constant. Each month, students removed and counted the number of insects present, recorded the total, and returned the insects to the box. The graph below shows the number of insects in the box over a 12month period.

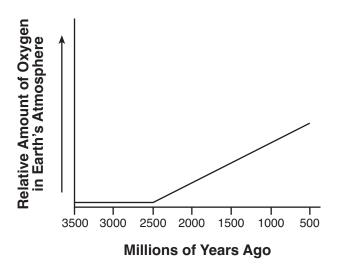




What inference can be made regarding this insect population?

- (1) All the insects in the box are the same age.
- (2) The insects hibernated from January to April.
- (3) The population has carnivorous members.
- (4) The population reached carrying capacity by January.

37 The relative amount of oxygen in the atmosphere of Earth over millions of years is shown in the graph below.



At what point in the history of Earth did autotrophs most likely first appear?

- (1) 3500 million years ago
- (2) 2500 million years ago

- (3) 1500 million years ago
- (4) 500 million years ago
- 38 A biologist collected the data shown in the table below.

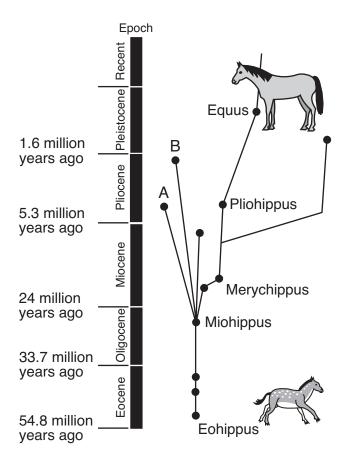
Data Table			
Turne of Ormaniam	Number of Organisms in a Field		
Type of Organism	Мау	July	September
grasshoppers	100	500	150
birds	25	100	10
spiders	75	200	50

Data Table

Which statement is supported by the data in the table?

- (1) Populations do not vary from month to month.
- (2) The populations are highest in September.
- (3) The grasshoppers increased in length in July.
- (4) Seasonal variations may affect populations.

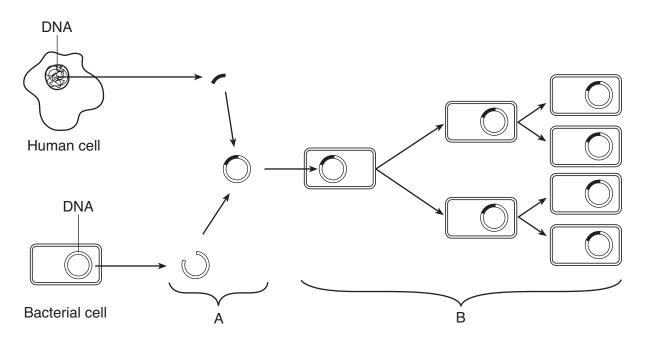
Base your answers to questions 39 and 40 on the diagram below, which represents possible relationships between animals in the family tree of the modern horse, and on your knowledge of biology.



39 One possible conclusion that can be drawn regarding ancestral horses A and B is that

- (1) A was better adapted to changes that occurred during the Pliocene Epoch than was B
- (2) the areas that B migrated to contained fewer varieties of producers than did the areas that A migrated to
- (3) competition between A and B led to the extinction of *Pliohippus*
- (4) the adaptive characteristics present in both A and B were insufficient for survival
- 40 *Miohippus* has been classified as a browser (an animal that feeds on shrubs and trees) while *Merychippus* has been classified as a grazer (an animal that feeds on grasses). One valid inference that can be made regarding the evolution of modern horses based on this information is that
 - (1) *Eohippus* inhabited grassland areas throughout the world
 - (2) *Pliohippus* had teeth adapted for grazing
 - (3) Equus evolved as a result of the migration of Pliohippus into forested areas due to increased competition
 - (4) ecological succession led to changes in tooth structure during the Eocene Epoch

Base your answers to questions 41 and 42 on the diagram below and on your knowledge of biology.



- 41 In the procedure indicated by letter A, DNA segments from humans and bacteria are joined by the action of
 - (1) starch molecules
 - (2) simple sugars

(3) enzymes(4) hormones

- 42 Which process is indicated by letter B?
 - (1) natural selection
 - $(2) \ \ as exual \ reproduction$

- (3) sexual reproduction
- (4) gene deletion

Part B-2

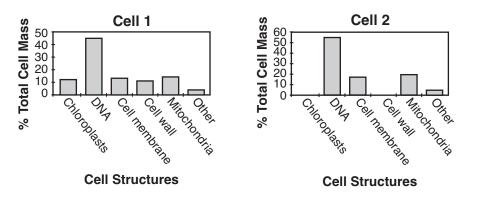
Answer all questions in this part. [13]

Directions (43–55): For those questions that are followed by four choices, circle the *number* of the choice that, of those given, best completes the statement or answers the question. For all other questions in this part, follow the directions given in the question and record your answers in the spaces provided.

43	Select <i>one</i> of the paired items below and describe how the first item in the pair regulates the second item for the maintenance of homeostasis. [1]	For Teacher Use Only
	insulin—blood sugar level CO_2 in blood—breathing rate	
	activity of guard cells—water loss from a leaf	
		43
44	Explain how harmful substances in the blood of a pregnant female can enter a fetus even though the blood vessels of the mother and fetus are <i>not</i> directly connected. $[1]$	
		44
45	Identify one farming practice that could be a source of environmental pollution. [1]	
		45

Base your answers to questions 46 through 49 on the passage below and on your knowledge of biology.	For Teacher Use Only
When humans perspire, water, urea, and salts containing sodium are removed from the blood. Drinking water during extended periods of physical exercise replenishes the water but not the sodium. This increase in water dilutes the blood and may result in the concentration of sodium dropping low enough to cause a condition known as hypo- natremia.	
Symptoms of hyponatremia include headache, nausea, and lack of coordination. Left untreated, it can lead to coma and even death. The body has a variety of feedback mechanisms that assist in regulating water and sodium concentrations in the blood. The kidneys play a major role in these mechanisms, as they filter the blood and produce urine.	
46 The best way to reduce the symptoms of hyponatremia would be to	
(1) drink more water	
(2) eat chocolate	
(3) eat salty foods	
(4) drink cranberry juice	46
47 Many runners pour water on their bodies during a race. Explain how this action helps to maintain homeostasis. [1]	
	47
48 How would running in a marathon on a warm day most likely affect urine production? Support your answer. [1]	
	48
49 Many people today drink sport drinks containing large amounts of sodium. Describe <i>one</i> possible effect this might have on a person who is <i>not</i> very active. [1]	
	49

50 Data from two different cells are shown in the graphs below.



Which cell is most likely a plant cell? Support your answer. [1]

50

Base your answers to questions 51 through 55 on the information below and on your knowledge of biology. The average level of carbon dioxide in the atmosphere has been measured for the past several decades. The data collected are shown in the table below.

Average CO₂ Levels in the Atmosphere

Year	CO ₂
	(in parts per million)
1960	320
1970	332
1980	350
1990	361
2000	370

Directions (51 and 52): Using the information in the data table, construct a line graph on the grid on the next page, following the directions below.

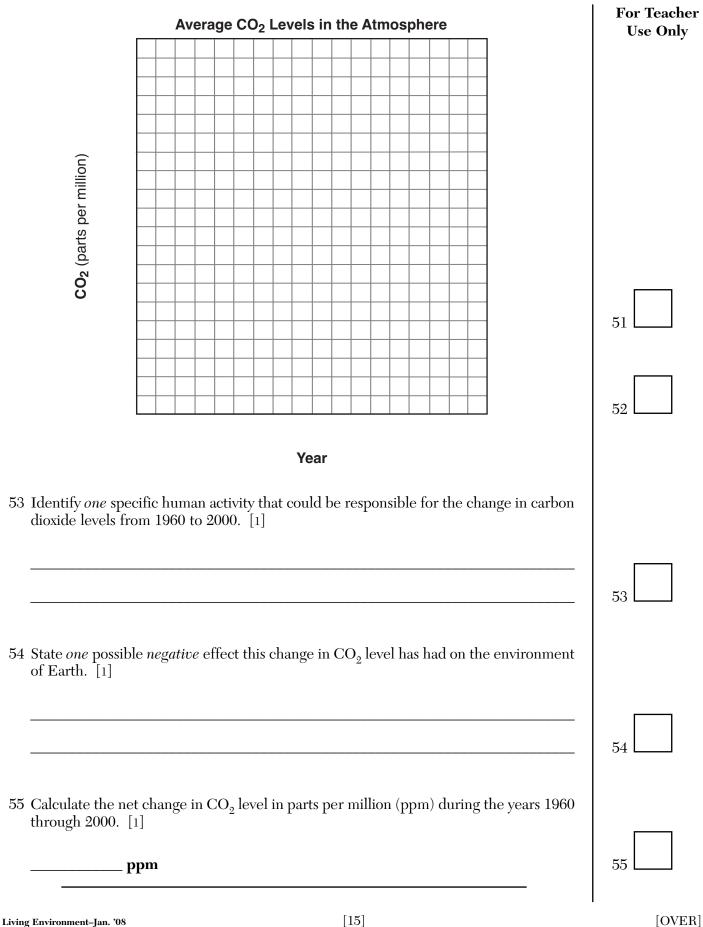
51 Mark an appropriate scale on each labeled axis. [1]

52 Plot the data on the grid. Surround each point with a small circle and connect the points. [1]

Example:

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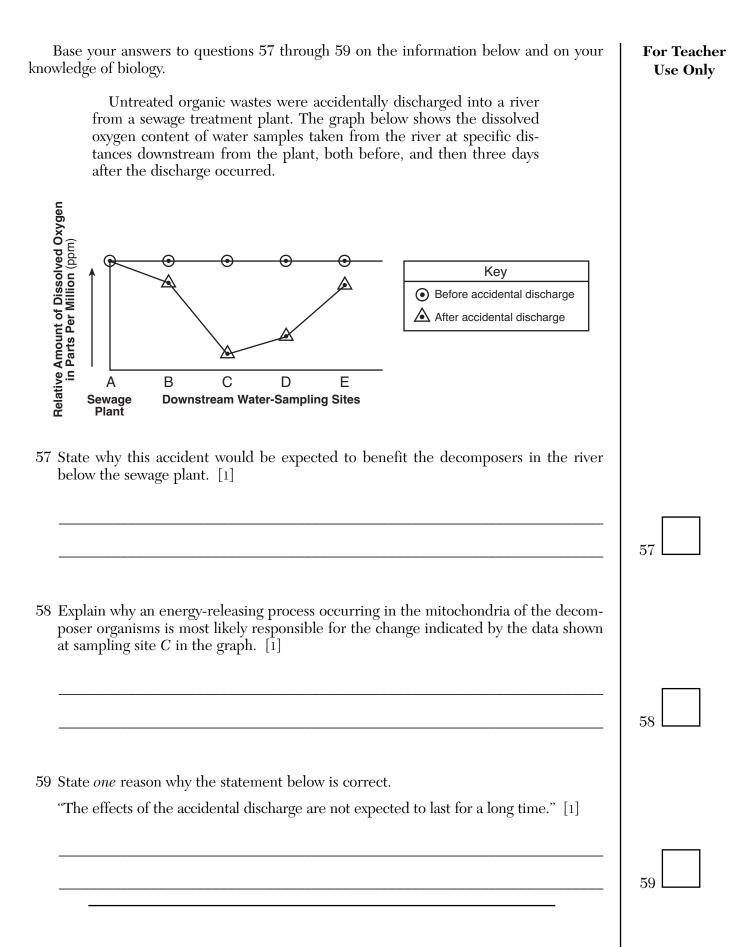


Part C

Answer all questions in this part. [17]

Directions (56–65): Record your answers in the spaces provided in this examination booklet.

56 Smallpox is a disease caused by a specific virus, while the common cold can be caused by over 100 different viruses. Explain why it is possible to develop a vaccine to prevent smallpox, but it is difficult to develop a vaccine to prevent the common cold. In your answer be sure to:	For Teacher Use Only
 identify the substance in a vaccine that makes the vaccine effective [1] explain the relationship between a vaccine and white blood cell activity [1] explain why the response of the immune system to a vaccine is specific [1] state <i>one</i> reason why it would be difficult to develop a vaccine to be used against the common cold [1] 	
	56

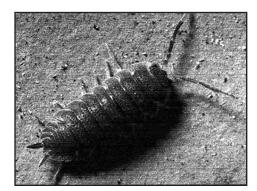


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[OVER]

60 The photograph below shows a pill bug. Pill bugs are small animals frequently found in wooded areas near decomposing organic material.

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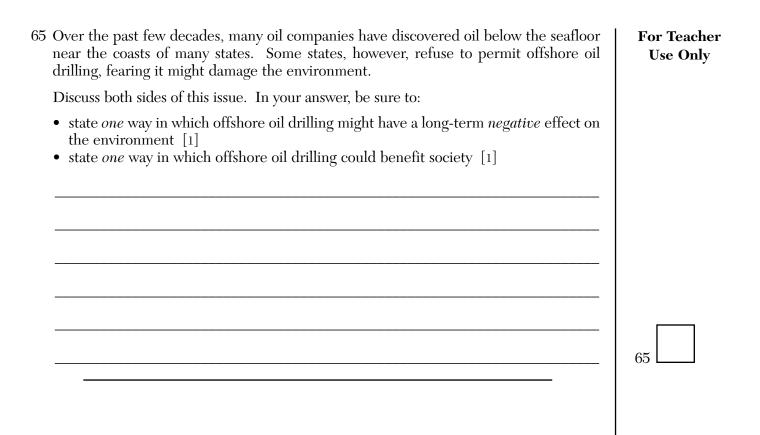


Describe some parts of an experiment to determine the preference of pill bugs for light or darkness. In your answer be sure to:

- state a hypothesis [1]
- identify the independent variable in the experiment [1]
- identify two conditions that should be kept the same in all experimental setups [1]
- state one example of experimental data that would support your hypothesis [1]

 60	

Base your answers to questions 61 through 64 on the information below and on your nowledge of biology.	For Teacher Use Only
In recent years, the striped bass population in Chesapeake Bay has been decreasing. This is due, in part, to events known as "fish kills," a large die-off of fish. Fish kills occur when oxygen-consuming processes in the aquatic ecosystem require more oxygen than the plants in the ecosystem produce, thereby reducing the amount of dissolved oxygen available to the fish. One proposed explanation for the increased fish kills in recent years is that human activities have increased the amount of sediment sus- pended in the water of Chesapeake Bay, largely due to increased ero- sion into its tributary streams. The sediment acts as a filter for sunlight, which causes a decrease in the intensity of the sunlight that reaches the aquatic plants in the Chesapeake Bay ecosystem.	
61 Identify <i>one</i> abiotic factor in the Chesapeake Bay ecosystem involved in the fish kills. [1]	
	61
62 Identify the process carried out by organisms that uses oxygen and contributes to the fish kills. [1]	62
53 State <i>one</i> way humans have contributed to the <i>decrease</i> of the striped bass population in Chesapeake Bay. [1]	
	63
64 State how a <i>decrease</i> in the amount of light may be responsible for fish kills in the Chesapeake Bay area. [1]	
	64



Part D

Answer all questions in this part. [13]

Directions (66–75): For those questions that are followed by four choices, circle the *number* of the choice, that, of those given, best completes the statement or answers the question. For all other questions in this part, follow the directions given in the question and record your answers in the spaces provided.

For Teacher 66 Researchers discovered four different species of finches on one of the Galapagos Islands. DNA analysis showed that these four species, shown in the illustration below, **Use Only** are closely related even though they vary in beak shape and size. It is thought that they share a common ancestor. Which factor most likely influenced these differences in beak size and shape? (1) Birds with poorly adapted beaks changed their beaks to get food. (2) Birds with yellow beaks were able to hide from predators. (3) Birds with successful beak adaptations obtained food and survived to have offspring. (4) Birds with large, sharp beaks become dominant. 66 67 Relationships between plant species may most accurately be determined by comparing the (1) habitats in which they live (2) structure of guard cells (3) base sequences of DNA (4) shape of their leaves 67

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Base your answers to questions 68 through 70 on the information below and on your knowledge of biology.

Cytochrome c is an enzyme located in the mitochondria of many types of cells. The number of differences in the amino acid sequences of Cytochrome c from different species are compared to human Cytochrome c in the data table below.

Billerences in Annue Acid Ocquences		
Organism	Number of Differences in Cytochrome c Compared to Humans	
tuna	21	
mold	48	
moth	31	
dog	11	
horse	12	
chicken	13	
monkey	1	

Differences in Amino Acid Sequences

- 68 Of the organisms listed below, which one has a DNA code for Cytochrome c that is most similar to that of a human?
 - (1) tuna
 - (2) chicken
 - (3) moth
 - $(4) \operatorname{dog}$
- 69 The fact that all of these organisms contain Cytochrome c could lead to the inference that
 - (1) Cytochrome c is essential for the reproduction of all organisms
 - (2) these organisms have all evolved from an ancestor that produced Cytochrome c
 - (3) mutations in genes that code for Cytochrome c always occur during DNA replication
 - (4) only heterotrophs make Cytochrome c

68	

69	

70 Cytochrome c is most likely a

- (1) protein molecule
- (2) material containing genes
- (3) carbohydrate that is absorbed by cells
- (4) component of the membrane around the cell
- 71 The data table below compares blood flow in various human body structures, both at rest and during strenuous exercise.

Structure	Blood Flow at Rest (mL/min)	Blood Flow During Strenuous Exercise (mL/min)
heart	250	750
skeletal muscle	1200	12,500
digestive organs	1400	600

Select *one* structure from the data table and write its name in the space below. Explain *one* way that the change in the rate of blood flow in this structure helps maintain homeostasis during exercise. [1]

Structure: _____

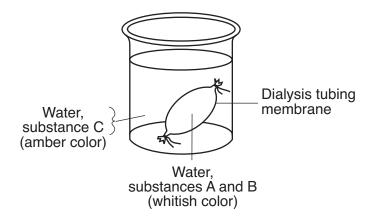
	eacher
Use	Only

70	
70	

71

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

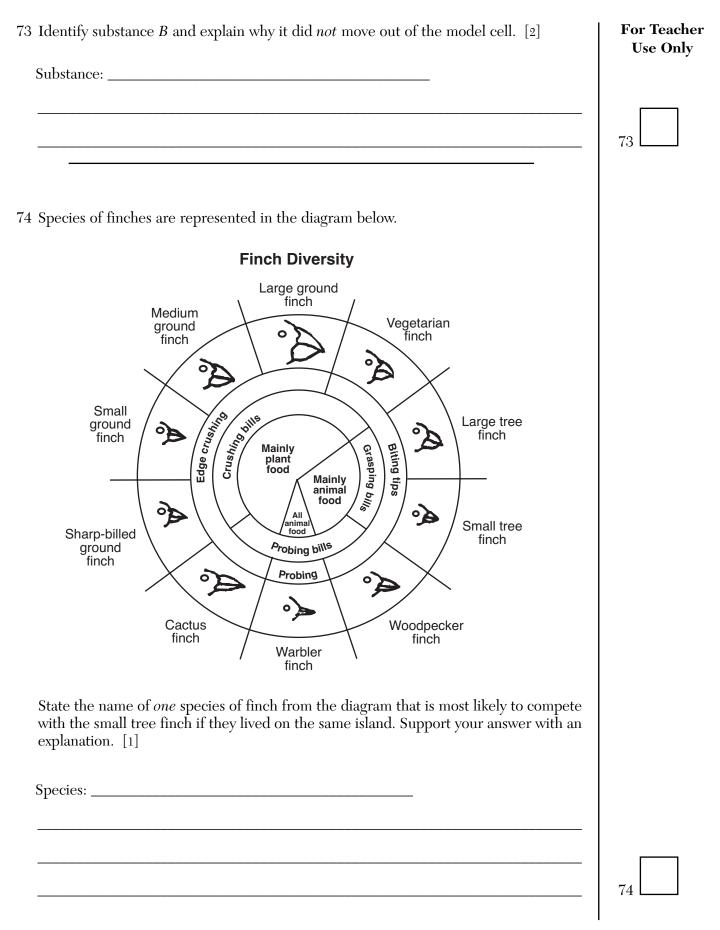
	Outside of Cell Model	Inside of Cell Model
Substances	water, A, C	water, A, B, C
Color	amber	blue black

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 L

For Teacher Use Only



75 Electrophoresis is a method of

- (1) separating DNA fragments
- (2) changing the genetic code of an organism
- (3) indicating the presence of starch
- $\left(4\right)\;$ separating colored compounds on a strip of paper

For Teacher Use Only



The U	niversity of the State	of New York		Maximum	Student's
Rege	NTS HIGH SCHOOL E	XAMINATION	Part	Score	Score
1 1\/1N	IG ENVIRC		<u>A</u>	30	
			<u>B-1</u>	12	
Friday, January	25, 2008 — 9:15 a	.m. to 12:15 p.m., only	<u>B-2</u>	13	
	ANGWED OHE	ET	<u>C</u>	17	
	ANSWER SHE	Female	D	13	
Student		Sex: 🗆 Male	Total Raw		
Teacher			Final Scor	Raw Score: 85) e	
School		Grade		version chart)	
			Raters' Ini	itials	
			Rater 1	Rater 2 .	
	_	_	_	_	
Kee	•	s to Part A and Part B–	-1 on this answ	wer sheet.	
	Part A			Part R_1	
1	Part A	91	21	Part B–1	
	11			37	
2	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	22	32	37 38	
2	11 12 13	22	32 33	37 38 39	
2	11 12 13 14	22	32 33	37 38	
$2 \dots \dots$ $3 \dots \dots$ $4 \dots \dots$ $5 \dots \dots$	 11 12 13 14 15 	22 23 24 25	32 33 34 35	37 38 39 40 41	· · · · · · · ·
2 3 4 5 6	11 12 13 14	22 23 24 25	32 33 34	37 38 39 40 41 42	· · · · · · · ·
$2 \dots \dots$ $3 \dots \dots$ $4 \dots \dots$ $5 \dots \dots$	 11 12 13 14 15 	22 23 24 25	32 33 34 35	37 38 39 40 41	· · · · · · · ·
2 3 4 5 6	11 12 13 14 15 16	22 23 24 25 26	32 33 34 35	37 38 39 40 41 42	· · · · · · · ·
2 3 4 5 6 7	11	22 23 24 25 26 27	32 33 34 35	37 38 39 40 41 42	· · · · · · · ·
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	22 23 24 25 26 27 28	32 33 34 35	37 38 39 40 41 42	· · · · · · · ·
2 3 4 5 6 7 8 9	11	$22 \dots \dots \\ 23 \dots \dots \\ 24 \dots \dots \\ 25 \dots \dots \\ 26 \dots \dots \\ 27 \dots \dots \\ 28 \dots \dots \\ 29 \dots \dots \end{pmatrix}$	32 33 34 35	37 38 39 40 41 42	· · · · · · · ·

Tear Here

Tear Here

The declaration below must be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination and that I have neither given nor received assistance in answering any of the questions during the examination.

FOR TEACHERS ONLY

The University of the State of New York REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Friday, January 25, 2008 — 9:15 a.m. to 12:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

LE

Refer to the directions on page 3 before rating student papers.

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site <u>http://www.emsc.nysed.gov/osa/</u> and select the link "Examination Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents examination period.

Part A	Part B–1		
1 2 11 3 21 3	31 4 37 2		
2 2 12 2 22 4	32 3 38 4		
3 4 13 1 23 1	33 1 39 4		
$4 \dots 1 \dots 14 \dots 14 \dots 24 \dots 3\dots$	34 1 40 2		
$5 \dots .4 \dots 15 \dots .4 \dots 25 \dots .2$	35 4 41 3		
$6 \dots .3 \dots 16 \dots .3 \dots 26 \dots .2 \dots$	36 4 42 2		
$7 \dots 4 \dots 17 \dots 2 \dots 27 \dots 1 \dots$			
8 4 18 1 28 4			
$9 \dots .1 \dots 19 \dots .4 \dots 29 \dots .3 \dots$			
$10 \dots .1 \dots 20 \dots .2 \dots .30 \dots .3 \dots$			

Part A and Part B–1 Allow 1 credit for each correct response.

Follow the procedures below for scoring student answer papers for the Regents Examination in Living Environment. Additional information about scoring is provided in the publication *Information Booklet for Scoring Regents Examinations in the Sciences*.

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the student's work by making insertions or changes of any kind.

Allow 1 credit for each correct response for multiple-choice questions.

On the detachable answer sheet for Part A and Part B-1, indicate by means of a checkmark each incorrect or omitted answer to multiple-choice questions. In the box provided in the upper right corner of the answer sheet, record the number of questions the student answered correctly for each of these parts.

At least two science teachers must participate in the scoring of the Part B–2, Part C, and Part D open-ended questions on a student's paper. Each of these teachers should be responsible for scoring a selected number of the open-ended questions on each answer paper. No one teacher is to score all the open-ended questions on a student's answer paper.

Students' responses must be scored strictly according to the Scoring Key and Rating Guide. For open-ended questions, credit may be allowed for responses other than those given in the rating guide if the response is a scientifically accurate answer to the question and demonstrates adequate knowledge as indicated by the examples in the rating guide. In the student's examination booklet, record the number of credits earned for each answer in the box printed to the right of the answer lines or spaces for that question.

Fractional credit is *not* allowed. Only whole-number credit may be given for a response. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

Raters should enter the scores earned for Part A, Part B–1, Part B–2, Part C, and Part D on the appropriate lines in the box printed on the answer sheet and should add these five scores and enter the total in the box labeled "Total Raw Score." Then the student's raw score should be converted to a scaled score by using the conversion chart that will be posted on the Department's web site <u>http://www.emsc.nysed.gov/osa/</u> on Friday, January 25, 2008. The student's scaled score should be entered in the box labeled "Final Score" on the student's answer sheet. The scaled score is the student's final examination score.

All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions that he/she scored in the first rating of the paper. The school principal is responsible for assuring that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

Because scaled scores corresponding to raw scores in the conversion chart may change from one examination to another, it is crucial that for each administration, the conversion chart provided for that administration be used to determine the student's final score.

LIVING ENVIRONMENT – continued

Part B-2

43 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Increased insulin results in a decrease in blood sugar levels.

- As the CO_2 level in the blood increases, the breathing rate increases.
- When the guard cells close openings in leaves, rate of water loss decreases.
- 44 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - Materials can diffuse out of the mother's capillaries into the baby's capillaries.
 - Harmful substances can diffuse/pass through the walls of capillaries.
 - Molecules pass through the placenta.
- 45 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - Pesticide use may pollute.
 - Fertilizer use may pollute.
 - Animal wastes used as fertilizer may end up in water supplies.

46 3

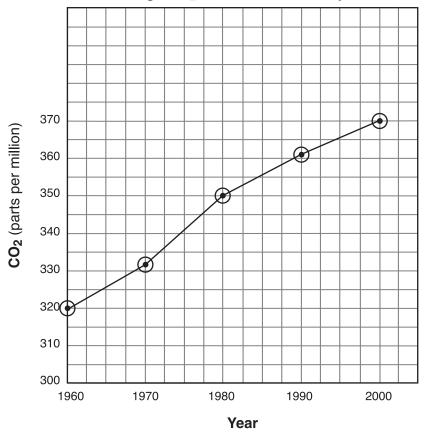
47 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- reduces loss of sodium
- cools the body
- decreases amount of perspiration
- slows down water loss
- reduces the chances of hyponatremia
- 48 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - Less urine would be produced because a large amount of water is being lost as sweat.
 - Less urine will be produced because the feedback mechanisms in the kidneys regulate water levels in the blood.
 - The runner would sweat more, decreasing H_2O levels in the blood. This decrease would slow urine production because there is less water in the blood to be filtered.
 - Urine would be more concentrated because it would contain less water.
- 49 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - It could raise their blood pressure.
 - It could cause them to retain water.
 - It could decrease urine production.
- **50** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - Cell 1, because it contains chloroplasts.
 - Cell 1, because it has a cell wall.

- **51** [1] Allow 1 credit for marking an appropriate scale on each axis.
- **52** [1] Allow 1 credit for plotting the data correctly (based on the student's scaled axes), surrounding each point with a small circle, and connecting the points.

Note: Allow credit even if the points are not circled.

Example of a 2-credit graph for questions 51 and 52:



Average CO₂ Levels in the Atmosphere

53 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- increased burning of fossil fuels
- more motor vehicle use
- increased levels of deforestation
- increase in human population

${\it LIVING}\ {\it Environment}-continued$

- **54** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - an increase in the number of severe storms
 - an increase in sea levels
 - flooding of coastal areas
 - changes in precipitation patterns
 - global warming
 - temperature increases
- **55** [1] Allow 1 credit for 50.

LIVING ENVIRONMENT – *continued*

Part C

56 [4] Allow a maximum of 4 credits, allocated as follows:

- Allow 1 credit for identifying the substance in a vaccine that makes the vaccine effective. Acceptable responses include, but are not limited to:
 - a dead virus
 - a weakened virus
 - weakened pathogen
- Allow 1 credit for explaining the relationship between a vaccine and white blood cell activity. Acceptable responses include, but are not limited to:
 - Antibodies are produced by a certain type of white blood cell in response to the vaccine.
- Allow 1 credit for explaining why the response of the immune system to a vaccine is specific. Acceptable responses include, but are not limited to:
 - Antibodies have specific shapes and each antibody shape is complementary to only one shape of virus or antigen.
- Allow 1 credit for stating *one* reason why it would be difficult to develop a vaccine to be used against the common cold. Acceptable responses include, but are not limited to:
 - Since the common cold is caused by many different viruses, a vaccine would have to contain all the different types of cold viruses.
- 57 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - large increase in their food supply
- **58** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - As the number of decomposers increases, they use more oxygen for respiration.
- **59** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - Once the discharge is stopped and the sewage in the river is broken down by decomposers, the oxygen levels should return to normal.
 - The sewage will be diluted and pushed along by the flowing water.

- 60 [4] Allow a maximum of 4 credits, allocated as follows:
 - Allow 1 credit for stating a valid hypothesis. Acceptable responses include, but are not limited to:
 - Pill bugs prefer the dark.
 - If pill bugs are given a choice of light or darkness, they will prefer the light area.
 - If a light and a dark area are provided in a closed container, the pill bugs will not exhibit a preference for either the light or dark area.
 - Allow 1 credit for identifying the independent variable. Acceptable responses include, but are not limited to:
 - presence or absence of light
 - amount of light
 - Allow 1 credit for identifying *two* conditions that should be kept the same in all experimental setups. Acceptable responses include, but are not limited to:
 - temperature
 - humidity
 - species of pill bug
 - type of container
 - number of pill bugs in each group
 - Allow 1 credit for stating *one* example of experimental data that would support the student's hypothesis (from the first bullet). Acceptable responses include, but are not limited to:
 - More pill bugs are found in the dark area after five minutes than in the light area.
 - More pill bugs are found in the light area at the completion of the experiment.
 - The same number of pill bugs are found in both the light and dark areas.

LIVING ENVIRONMENT – continued

61 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- oxygen
- light
- temperature
- sediment
- carbon dioxide

62 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- respiration
- decomposition

63 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- increased sediments
- pollution
- overfishing
- cutting down trees

64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- A decrease in the amount of light will affect photosynthesis and will reduce the amount of oxygen.
- Less light means less photosynthesis and less oxygen for fish respiration.

65 [2] Allow a maximum of 2 credits, allocated as follows:

- Allow 1 credit for stating *one* way in which offshore oil drilling might have a long-term *negative* effect on the environment. Acceptable responses include, but are not limited to:
 - damage habitats of ocean organisms
 - cause water pollution from spills
- Allow 1 credit for stating *one* way in which offshore oil drilling could benefit society. Acceptable responses include, but are not limited to:
 - use domestic rather than foreign source of oil
 - create jobs
 - keep prices low
 - increase the oil supply

LIVING ENVIRONMENT – *continued*

Part D

66 3
67 3
68 4
69 2
70 1

71 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- heart: increased blood flow supplies more oxygen and/or nutrients
- skeletal muscle: greatly increased supply of blood, providing additional oxygen and/or nutrients
- skeletal muscle: removes more waste during exercise
- digestive organs: a reduction in blood flow, diverting blood to other parts of the body where use of oxygen has increased
- **72** [3] Allow a maximum of 3 credits, 1 credit for each acceptable response. Acceptable responses include, but are not limited to:

Name of Substance C	Direction of Movement of Substance C	Reason for the Movement of Substance C
— starch indicator — iodine	 — into model cell — from high to low concentration 	 — small size of molecules — differences in concentration — diffusion

- 73 [2] Allow a maximum of 2 credits, allocated as follows:
 - Allow 1 credit for identifying substance B. Acceptable responses include, but are not limited to:
 - starch
 - polysaccharide
 - complex carbohydrate
 - Allow 1 credit for explaining why substance B did *not* move out of the model cell. Acceptable responses include, but are not limited to:
 - It is a large molecule.
 - too big
- 74 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
 - The large tree finch is most likely to compete with the small tree finch because they both eat mainly animal food.

75 1

The Chart for Determining the Final Examination Score for the January 2008 Regents Examination in Living Environment will be posted on the Department's web site <u>http://www.emsc.nysed.gov/osa/</u> on Friday, January 25, 2008. Conversion charts provided for previous administrations of the Regents Examination in Living Environment must NOT be used to determine students' final scores for this administration.

Submitting Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

- 1. Go to <u>www.emsc.nysed.gov/osa/exameval/</u>.
- 2. Select the test title.
- 3. Complete the required demographic fields.
- 4. Complete each evaluation question and provide comments in the space provided.
- 5. Click the SUBMIT button at the bottom of the page to submit the completed form.

Map to Core Curriculum

January 2008 Living Environment

	Question Numbers					
Standards	Part A 1–30	Part B–1 31–42	Part B-2 43-55	Part C 56–65		
Standard 1 — Analysis, Inquiry and Design						
Key Idea 1		31				
Key Idea 2	5	32		60		
Key Idea 3		33	55			
Appendix A (Laboratory Checklist)			51,52			
Standard 4						
Key Idea 1	2,3,6,9	38	43,48,50	58,62,63		
Key Idea 2	1,4,7,8,11,12,13	41				
Key Idea 3	10,15,17	34,37,39,40				
Key Idea 4	14,16,18,19,20	42	44			
Key Idea 5	21,22,28,30		46,47,49	56		
Key Idea 6	23,24,25,26	35,36		57,61		
Key Idea 7	27,29		45,53,54	59,64,65		

Part D 66–75			
Lab 1	67,68,69,70,75		
Lab 2	71		
Lab 3	66,74		
Lab 5	72,73		



Regents Examination in Living Environment January 2008

Chart for Converting Total Test Raw Scores to Final Examination Scores (Scaled Scores)

Raw	Scaled	Raw	Scaled	Raw	Scaled
Score	Score	Score	Score	Score	Score
85	100	56	78	27	52
84	99	55	78	26	50
83	98	54	77	25	49
82	97	53	76	24	47
81	96	52	76	23	46
80	95	51	75	22	44
79	94	50	74	21	43
78	93	49	74	20	41
77	92	48	73	19	40
76	92	47	72	18	38
75	91	46	71	17	37
74	90	45	70	16	35
73	89	44	70	15	33
72	89	43	69	14	31
71	88	42	68	13	29
70	87	41	67	12	27
69	87	40	66	11	26
68	86	39	65	10	24
67	86	38	64	9	21
66	85	37	63	8	19
65	84	36	62	7	17
64	83	35	61	6	15
63	83	34	60	5	13
62	82	33	59	4	10
61	81	32	58	3	8
60	81	31	57	2	5
59	80	30	55	1	3
58	80	29	54	0	0
57	79	28	53		

To determine the student's final examination score, find the student's total test raw score in the column labeled "Raw Score" and then locate the scaled score that corresponds to that raw score. The scaled score is the student's final examination score. Enter this score in the space labeled "Final Score" on the student's answer sheet.

All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions that he/she scored in the first rating of the paper. The school principal is responsible for assuring that the student's final examination score is based on a fair, accurate and reliable scoring of the student's answer paper.

Because scaled scores corresponding to raw scores in the conversion chart change from one examination to another, it is crucial that for each administration, the conversion chart provided for that administration be used to determine the student's final score. The chart above is usable only for this administration of the Living Environment Examination.