The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Tuesday, June 24, 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 all 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 chart below contains both autotrophic and heterotrophic organisms.

A	owl	cat	shark
B	mouse	corn	dog
C	squirrel	bluebird	alga

Organisms that carry out only heterotrophic nutrition are found in

(1) row *A*, only
(2) row *B*, only
(3) rows *A* and *B*
(4) rows *A* and *C*

2 A stable pond ecosystem would *not* contain

(1) materials being cycled
(2) oxygen
(3) decomposers
(4) more consumers than producers

3 Although all of the cells of a human develop from one fertilized egg, the human is born with many different types of cells. Which statement best explains this observation?

(1) Developing cells may express different parts of their identical genetic instructions.
(2) Mutations occur during development as a result of environmental conditions.
(3) All cells have different genetic material.
(4) Some cells develop before other cells.

4 Humans require organ systems to carry out life processes. Single-celled organisms do not have organ systems and yet they are able to carry out life processes. This is because

(1) human organ systems lack the organelles found in single-celled organisms
(2) a human cell is more efficient than the cell of a single-celled organism
(3) it is not necessary for single-celled organisms to maintain homeostasis
(4) organelles present in single-celled organisms act in a manner similar to organ systems

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

(1) store information
(2) build proteins
(3) release energy from nutrients
(4) dispose of metabolic wastes

6 At warm temperatures, a certain bread mold can often be seen growing on bread as a dark-colored mass. The same bread mold growing on bread in a cooler environment is red in color. Which statement most accurately describes why this change in the color of the bread mold occurs?

(1) Gene expression can be modified by interactions with the environment.
(2) Every organism has a different set of coded instructions.
(3) The DNA was altered in response to an environmental condition.
(4) There is no replication of genetic material in the cooler environment.

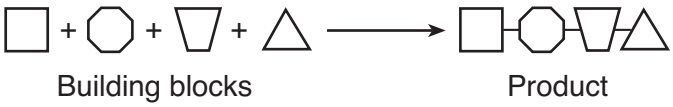
7 Asexually reproducing organisms pass on hereditary information as

(1) sequences of A, T, C, and G
(2) chains of complex amino acids
(3) folded protein molecules
(4) simple inorganic sugars

8 Species of bacteria can evolve more quickly than species of mammals because bacteria have

(1) less competition
(2) more chromosomes
(3) lower mutation rates
(4) higher rates of reproduction

9 The diagram below represents the synthesis of a portion of a complex molecule in an organism.

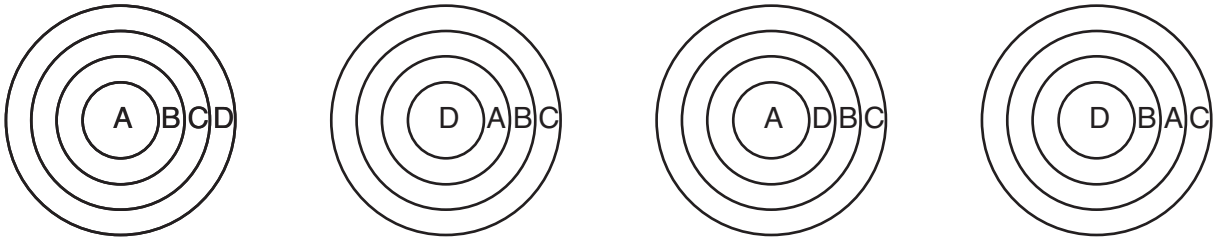


Which row in the chart could be used to identify the building blocks and product in the diagram?

Row	Building Blocks	Product
(1)	starch molecules	glucose
(2)	amino acid molecules	part of protein
(3)	sugar molecules	ATP
(4)	DNA molecules	part of starch

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

A–chromosome
B–nucleus
C–cell
D–gene



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

11 Which nuclear process is represented below?

A DNA molecule untwists. → The two strands of DNA separate. → Molecular bases pair up. → Two identical DNA molecules are produced.

(1) recombination
(2) fertilization
(3) replication
(4) mutation

12 For centuries, certain animals have been crossed to produce offspring that have desirable qualities. Dogs have been mated to produce Labradors, beagles, and poodles. All of these dogs look and behave very differently from one another. This technique of producing organisms with specific qualities is known as

(1) gene replication
(2) natural selection
(3) random mutation
(4) selective breeding

13 Certain insects resemble the bark of the trees on which they live. Which statement provides a possible biological explanation for this resemblance?

(1) The insects needed camouflage so they developed protective coloration.
(2) Natural selection played a role in the development of this protective coloration.
(3) The lack of mutations resulted in the protective coloration.
(4) The trees caused mutations in the insects that resulted in protective coloration.

14 When is extinction of a species most likely to occur?

(1) when environmental conditions remain the same and the proportion of individuals within the species that lack adaptive traits increases
(2) when environmental conditions remain the same and the proportion of individuals within the species that possess adaptive traits increases
(3) when environmental conditions change and the adaptive traits of the species favor the survival and reproduction of some of its members
(4) when environmental conditions change and the members of the species lack adaptive traits to survive and reproduce

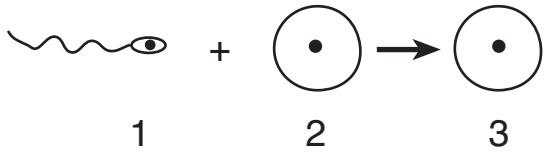
15 In what way are photosynthesis and cellular respiration similar?

(1) They both occur in chloroplasts.
(2) They both require sunlight.
(3) They both involve organic and inorganic molecules.
(4) They both require oxygen and produce carbon dioxide.

16 Which process will increase variations that could be inherited?

(1) mitotic cell division
(2) active transport
(3) recombination of genes
(4) synthesis of proteins

17 Some cells involved in the process of reproduction are represented in the diagram below.



The process of meiosis formed

(1) cell 1, only
(2) cells 1 and 2
(3) cell 3, only
(4) cells 2 and 3

18 Kangaroos are mammals that lack a placenta. Therefore, they must have an alternate way of supplying the developing embryo with

(1) nutrients
(2) carbon dioxide
(3) enzymes
(4) genetic information

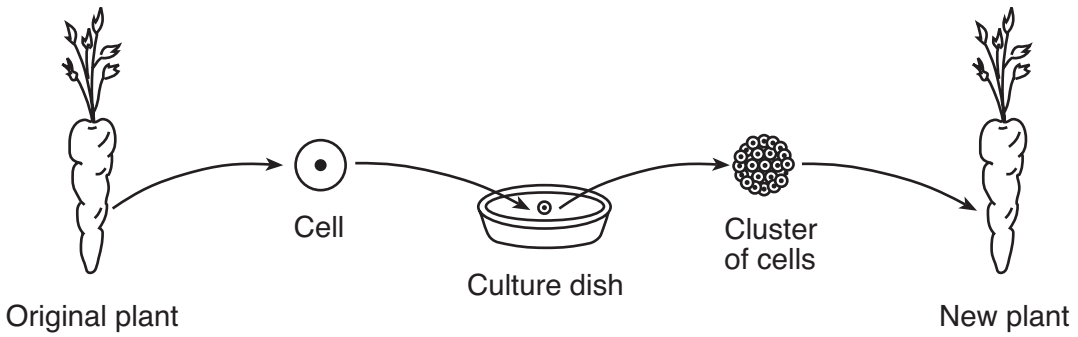
19 Which substance is the most direct source of the energy that an animal cell uses for the synthesis of materials?

(1) ATP
(2) glucose
(3) DNA
(4) starch

20 To increase chances for a successful organ transplant, the person receiving the organ should be given special medications. The purpose of these medications is to

(1) increase the immune response in the person receiving the transplant
(2) decrease the immune response in the person receiving the transplant
(3) decrease mutations in the person receiving the transplant
(4) increase mutations in the person receiving the transplant

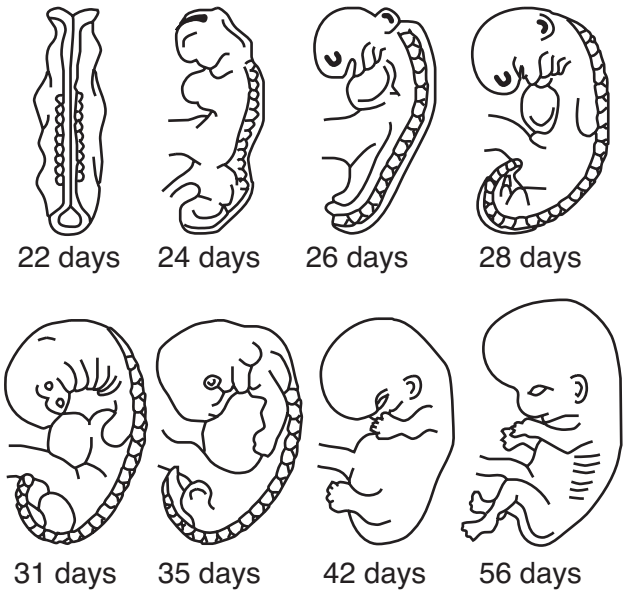
21 The diagram below represents the cloning of a carrot plant.



Compared to each cell of the original carrot plant, each cell of the new plant will have

(1) the same number of chromosomes and the same types of genes
(2) the same number of chromosomes, but different types of genes
(3) half the number of chromosomes and the same types of genes
(4) half the number of chromosomes, but different types of genes

22 The development of an embryo is represented in the diagram below.

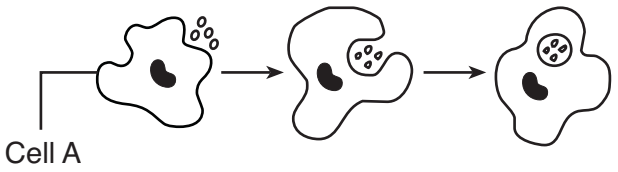


(Not drawn to scale)

These changes in the form of the embryo are a direct result of

(1) uncontrolled cell division and mutations
(2) differentiation and growth
(3) antibodies and antigens inherited from the father
(4) meiosis and fertilization

23 The diagram below represents an event that occurs in the blood.



Which statement best describes this event?

(1) Cell *A* is a white blood cell releasing antigens to destroy bacteria.
(2) Cell *A* is a cancer cell produced by the immune system and it is helping to prevent disease.
(3) Cell *A* is a white blood cell engulfing disease-causing organisms.
(4) Cell *A* is protecting bacteria so they can reproduce without being destroyed by predators.

24 In an ecosystem, the growth and survival of organisms are dependent on the availability of the energy from the Sun. This energy is available to organisms in the ecosystem because

(1) producers have the ability to store energy from light in organic molecules
(2) consumers have the ability to transfer chemical energy stored in bonds to plants
(3) all organisms in a food web have the ability to use light energy
(4) all organisms in a food web feed on autotrophs

25 Which factor has the greatest influence on the type of ecosystem that will form in a particular geographic area?

(1) genetic variations in the animals
(2) climate conditions
(3) number of carnivores
(4) percentage of nitrogen gas in the atmosphere

26 Farming reduces the natural biodiversity of an area, yet farms are necessary to feed the world's human population. This situation is an example of

(1) poor land use
(2) a trade-off
(3) conservation
(4) a technological fix

27 A food chain is represented below.

Grass → Cricket → Frog → Owl

This food chain contains

(1) 4 consumers and no producers
(2) 1 predator, 1 parasite, and 2 producers
(3) 2 carnivores and 2 herbivores
(4) 2 predators, 1 herbivore, and 1 producer

28 A volcanic eruption destroyed a forest, covering the soil with volcanic ash. For many years, only small plants could grow. Slowly, soil formed in which shrubs and trees could grow. These changes are an example of

(1) manipulation of genes
(2) evolution of a species
(3) ecological succession
(4) equilibrium

29 A major reason that humans can have such a significant impact on an ecological community is that humans

(1) can modify their environment through technology
(2) reproduce faster than most other species
(3) are able to increase the amount of finite resources available
(4) remove large amounts of carbon dioxide from the air

30 Rabbits are herbivores that are not native to Australia. Their numbers have increased steadily since being introduced into Australia by European settlers. One likely reason the rabbit population was able to grow so large is that the rabbits

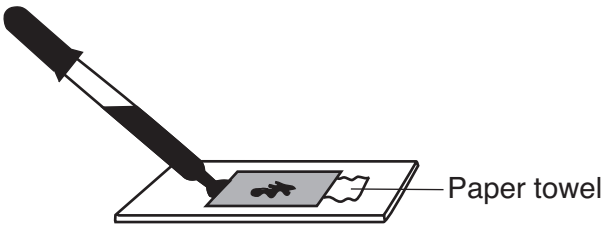
(1) were able to prey on native herbivores
(2) reproduced more slowly than the native animals
(3) successfully competed with native herbivores for food
(4) could interbreed with the native animals

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 Which laboratory procedure is represented in the diagram below?



(1) placing a coverslip over a specimen
(2) removing a coverslip from a slide
(3) adding stain to a slide without removing the coverslip
(4) reducing the size of air bubbles under a coverslip

32 In the United States, there has been relatively little experimentation involving the insertion of genes from other species into human DNA. One reason for the lack of these experiments is that

(1) the subunits of human DNA are different from the DNA subunits of other species
(2) there are many ethical questions to be answered before inserting foreign genes into human DNA
(3) inserting foreign DNA into human DNA would require using techniques completely different from those used to insert foreign DNA into the DNA of other mammals
(4) human DNA always promotes human survival, so there is no need to alter it

33 The development of an experimental research plan should *not* include a

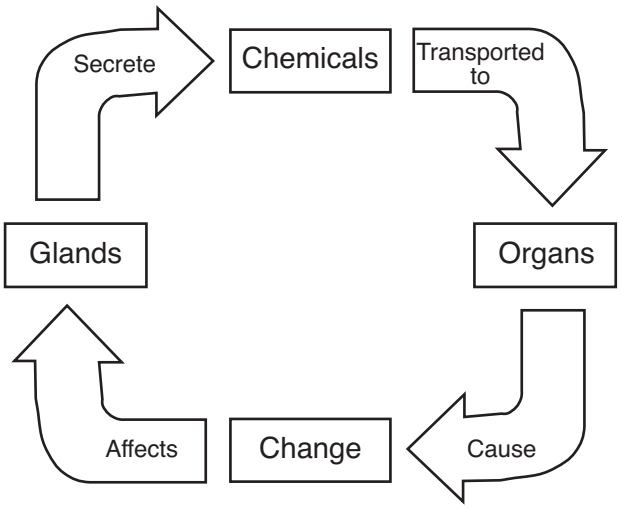
(1) list of safety precautions for the experiment
(2) list of equipment needed for conducting the experiment
(3) procedure for the use of technologies needed for the experiment
(4) conclusion based on data expected to be collected in the experiment

34 A student performed an experiment to demonstrate that a plant needs chlorophyll for photosynthesis. He used plants that had green leaves with white areas. After exposing the plants to sunlight, he removed a leaf from each plant and processed the leaves to remove the chlorophyll. He then tested each leaf for the presence of starch. Starch was found in the area of the leaf that was green, and no starch was found in the area of the leaf that was white. He concluded that chlorophyll is necessary for photosynthesis.

Which statement represents an assumption the student had to make in order to draw this conclusion?

(1) Starch is synthesized from the glucose produced in the green areas of the leaf.
(2) Starch is converted to chlorophyll in the green areas of the leaf.
(3) The white areas of the leaf do not have cells.
(4) The green areas of the leaf are heterotrophic.

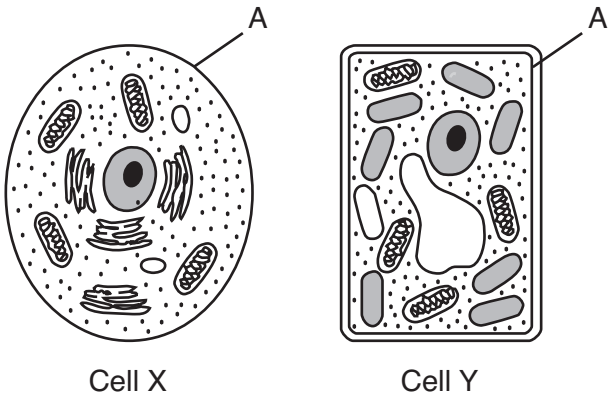
35 The diagram below represents an interaction between parts of an organism.



The term *chemicals* in this diagram represents

(1) starch molecules
(2) DNA molecules
(3) hormone molecules
(4) receptor molecules

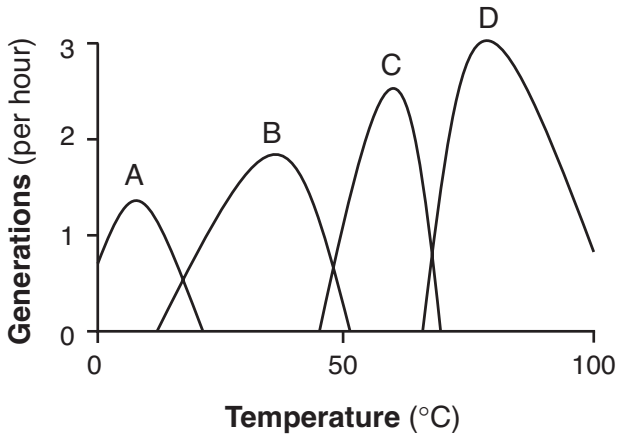
36 The diagram below represents two cells, *X* and *Y*.



Which statement is correct concerning the structure labeled *A*?

(1) It aids in the removal of metabolic wastes in both cell *X* and cell *Y*.
(2) It is involved in cell communication in cell *X*, but not in cell *Y*.
(3) It prevents the absorption of CO_2 in cell *X* and O_2 in cell *Y*.
(4) It represents the cell wall in cell *X* and the cell membrane in cell *Y*.

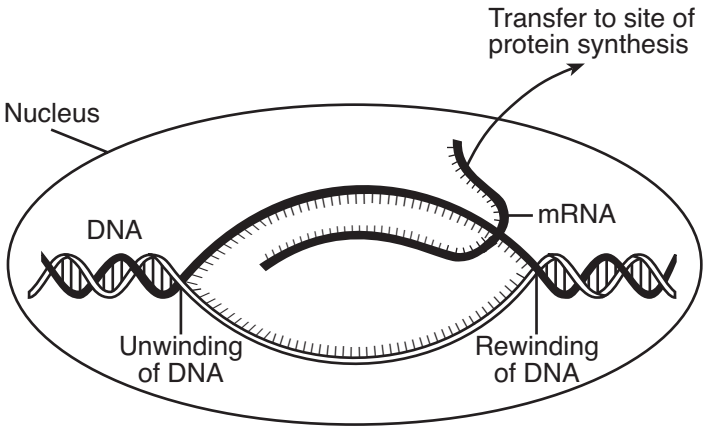
37 The graph below provides information about the reproductive rates of four species of bacteria, *A*, *B*, *C*, and *D*, at different temperatures.



Which statement is a valid conclusion based on the information in the graph?

(1) Changes in temperature cause bacteria to adapt to form new species.
(2) Increasing temperatures speed up bacterial reproduction.
(3) Bacteria can survive only at temperatures between 0°C and 100°C.
(4) Individual species reproduce within a specific range of temperatures.

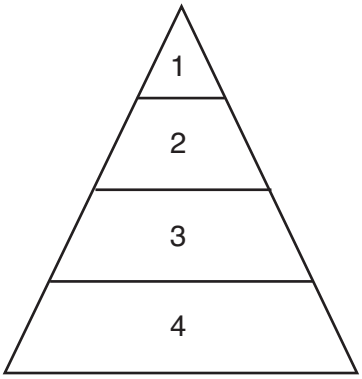
38 The diagram below shows some of the steps in protein synthesis.



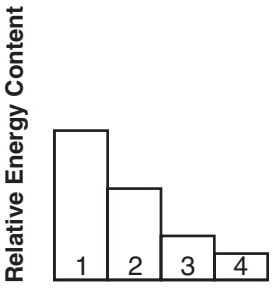
The section of DNA being used to make the strand of mRNA is known as a

(1) carbohydrate
(2) gene
(3) ribosome
(4) chromosome

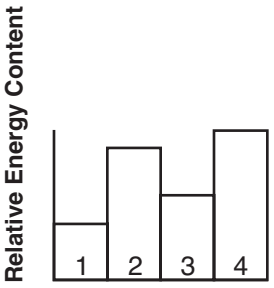
39 An energy pyramid is shown below.



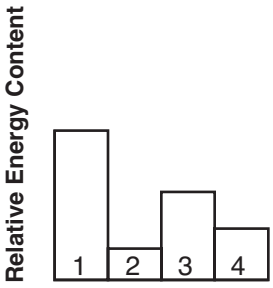
Which graph best represents the relative energy content of the levels of this pyramid?



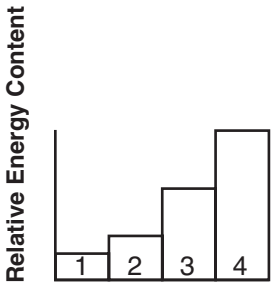
(1)



(2)

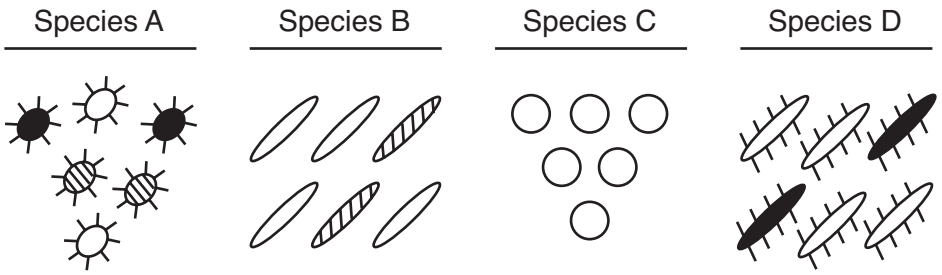


(3)



(4)

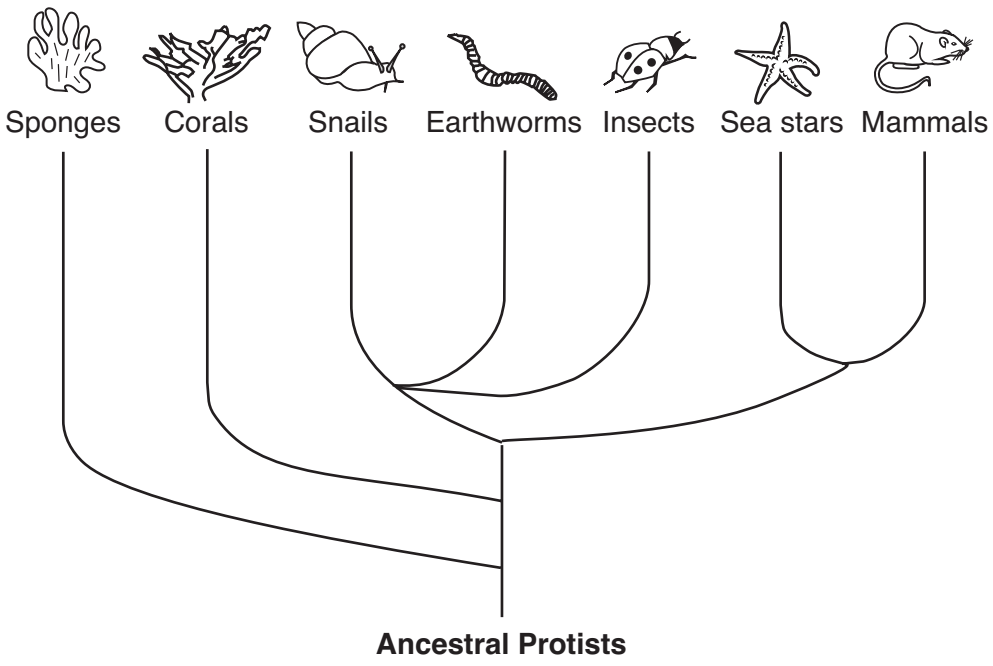
40 The diagram below represents four different species of bacteria.



Which statement is correct concerning the chances of survival for these species if there is a change in the environment?

(1) Species *A* has the best chance of survival because it has the most genetic diversity.
(2) Species *C* has the best chance of survival because it has no gene mutations.
(3) Neither species *B* nor species *D* will survive because they compete for the same resources.
(4) None of the species will survive because bacteria reproduce asexually.

41 The diagram below represents possible evolutionary relationships between groups of organisms.



Which statement is a valid conclusion that can be drawn from the diagram?

(1) Snails appeared on Earth before corals.
(2) Sponges were the last new species to appear on Earth.
(3) Earthworms and sea stars have a common ancestor.
(4) Insects are more complex than mammals.

42 On which day did the population represented in the graph below reach the carrying capacity of the ecosystem?

(1) day 11
(2) day 8
(3) day 3
(4) day 5

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.

For Teacher Use Only

Base your answers to questions 43 through 47 on the information below and on your knowledge of biology.

Each year, a New York State power agency provides its customers with information about some of the fuel sources used in generating electricity. The table below applies to the period of 2002–2003.

Fuel Sources Used

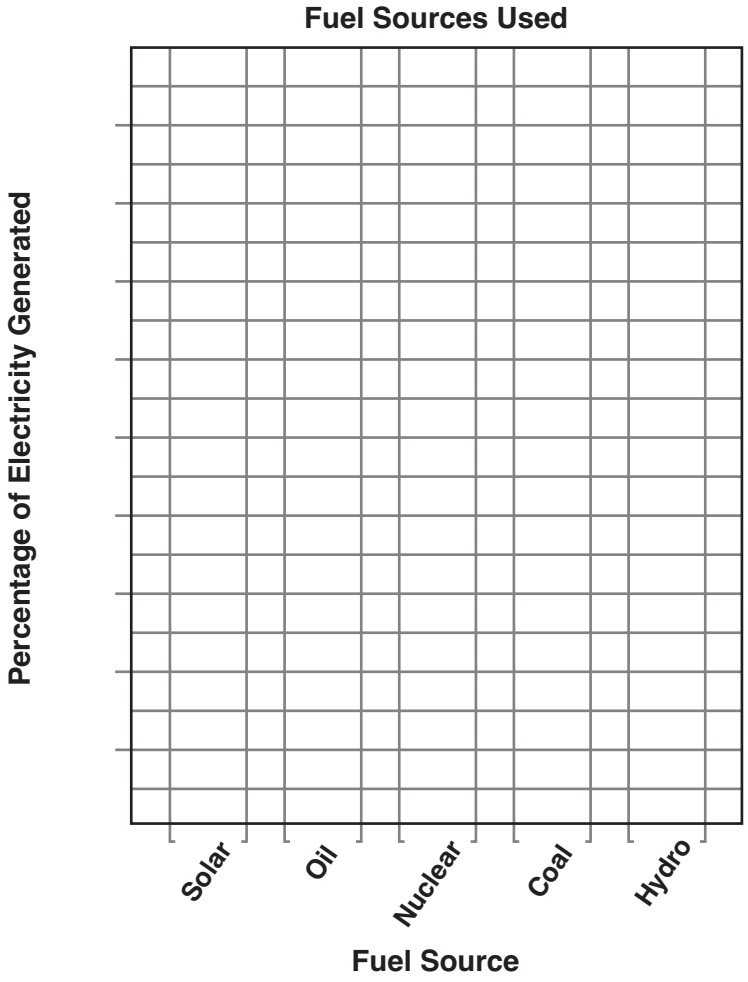
Fuel Source	Percentage of Electricity Generated
hydro (water)	86
coal	5
nuclear	4
oil	1
solar	0

Directions (43 and 44): Using the information given, construct a bar graph *on the grid on the next page*, following the directions below.

43 Mark an appropriate scale on the axis labeled "Percentage of Electricity Generated." [1]

44 Construct vertical bars to represent the data. Shade in *each* bar. [1]

For Teacher Use Only



43 ☐

44 ☐

45 Identify *one* fuel source in the table that is considered a fossil fuel. [1]

_____

45 ☐

46 Identify *one* fuel source in the table that is classified as a renewable resource. [1]

_____

46 ☐

47 State *one* specific environmental problem that can result from burning coal to generate electricity. [1]

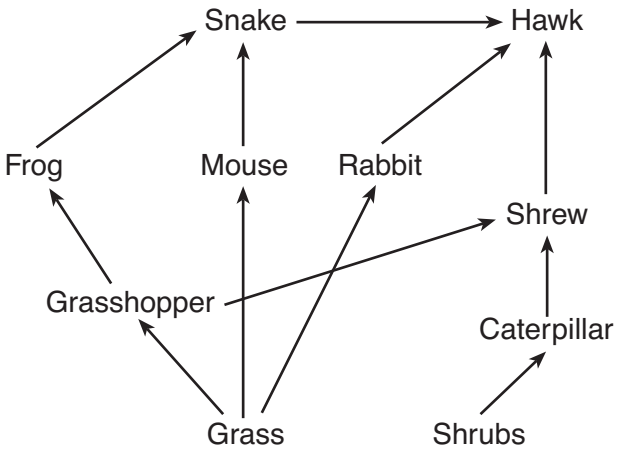
_____

_____

47 ☐

Base your answers to questions 48 and 49 on the diagram below that shows some interactions between several organisms located in a meadow environment and on your knowledge of biology.

For Teacher Use Only



48 A rapid *decrease* in the frog population results in a change in the hawk population. State how the hawk population may change. Support your answer. [1]

_____

_____ 48 ☐

49 Identify *one* cell structure found in a producer in this meadow ecosystem that is *not* found in the carnivores. [1]

_____ 49 ☐

50 Individuals of some species, such as earthworms, have both male and female sex organs. In many cases, however, these individuals do not fertilize their own eggs.

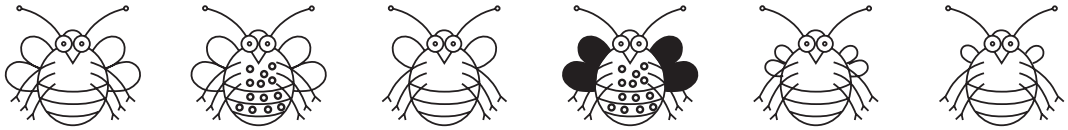
State *one* genetic advantage of an earthworm mating with another earthworm for the production of offspring. [1]

_____

_____ 50 ☐

Base your answers to questions 51 and 52 on the diagram below and on your knowledge of biology. The diagram represents six insect species.

For Teacher Use Only



Species E Species F

51 A dichotomous key to these six species is shown below. Complete the missing information for sections 5.*a*. and 5.*b*. so that the key is complete for all *six* species. [1]

Dichotomous Key

1. a. has small wings .....go to 2
   b. has large wings.....go to 3

2. a. has a single pair of wings .....Species A
   b. has a double pair of wings .....Species B

3. a. has a double pair of wings .....go to 4
   b. has a single pair of wings.....Species C

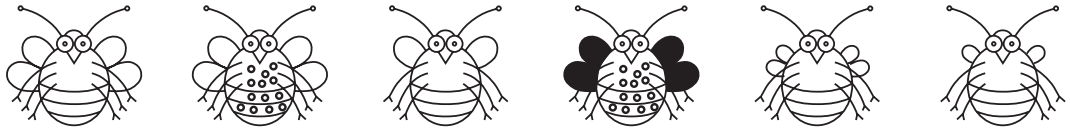
4. a. has spots .....go to 5
   b. does not have spots .....Species D

5. a. _____.....Species E

   b. _____.....Species F

51 ☐

52 Use the key to identify the drawings of species *A*, *B*, *C*, and *D*. Place the letter of *each* species on the line located below the drawing of the species. [1]



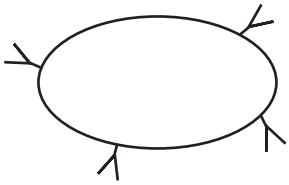
Species ___ Species E Species ___ Species F Species ___ Species ___

52 ☐

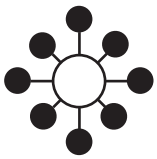
Base your answers to questions 53 through 55 on the information below and on your knowledge of biology.

For Teacher Use Only

Proteins on the surface of a human cell and on a bird influenza virus are represented in the diagram below.



Human Cell



Bird Influenza Virus

53 In the space below, draw a change in the bird influenza virus that would allow it to infect this human cell. [1]

53 ☐

54 Explain how this change in the virus could come about. [1]

_____

_____ 54 ☐

55 Identify the relationship that exists between a virus and a human when the virus infects the human. [1]

_____

_____ 55 ☐

Part C

Answer all questions in this part. [17]

Directions (56–67): Record your answers in the spaces provided in this examination booklet.

For Teacher Use Only

Base your answers to questions 56 and 57 on the information below and on your knowledge of biology.

Insulin is a hormone that has an important role in the maintenance of homeostasis in humans.

56 Identify the structure in the human body that is the usual source of insulin. [1]

_____

56 ☐

57 Identify a substance in the blood, other than insulin, that could change in concentration and indicate a person is not secreting insulin in normal amounts. [1]

_____

57 ☐

Base your answers to questions 58 and 59 on the information below and on your knowledge of biology.

The hedgehog, a small mammal native to Africa and Europe, has been introduced to the United States as an exotic pet species. Scientists have found that hedgehogs can transfer pathogens to humans and domestic animals. Foot-and-mouth viruses, *Salmonella*, and certain fungi are known pathogens carried by hedgehogs. As more and more of these exotic animals are brought into this country, the risk of infection increases in the human population.

58 State *one negative* effect of importing exotic species to the United States. [1]

_____

_____

58 ☐

59 State *one* way the human immune system might respond to an invading pathogen associated with handling a hedgehog. [1]

_____

_____

59 ☐

Base your answers to questions 60 through 62 on the information below and on your knowledge of biology.

For Teacher Use Only

The last known wolf native to the Adirondack Mountains of New York State was killed over a century ago. Several environmental groups have recently proposed reintroducing the wolf to the Adirondacks. These groups claim there is sufficient prey to support a wolf population in this area. These prey include beaver, deer, and moose. Opponents of this proposal state that the Adirondacks already have a dominant predator, the Eastern coyote.

60 State *one* effect the reintroduction of the wolf may have on the coyote population within the Adirondacks. Explain why it would have this effect. [1]

_____

_____ 60 ☐

61 Explain why the coyote is considered a limiting factor in the Adirondack Mountains. [1]

_____

_____ 61 ☐

62 State *one* ecological reason why some individuals might support the reintroduction of wolves to the Adirondacks. [1]

_____

_____ 62 ☐

63 You have been assigned to design an experiment to determine the effects of light on the growth of tomato plants. In your experimental design be sure to:

- state *one* hypothesis to be tested [1]
- identify the independent variable in the experiment [1]
- describe the type of data to be collected [1]

For Teacher Use Only

63 ☐

64 In some land plants, guard cells are found only on the lower surfaces of the leaves. In some water plants, guard cells are found only on the upper surfaces of the leaves. Explain how guard cells in both land and water plants help maintain homeostasis. In your answer be sure to:

- identify *one* function regulated by the guard cells in leaves [1]
- explain how guard cells carry out this function [1]
- give *one* possible evolutionary advantage of the position of the guard cells on the leaves of land plants [1]

64 ☐

Base your answers to questions 65 and 66 on the information below and on your knowledge of biology.

Scientists are increasingly concerned about the possible effects of damage to the ozone layer.

For Teacher Use Only

65 Damage to the ozone layer has resulted in mutations in skin cells that lead to cancer. Will the mutations that caused the skin cancers be passed on to offspring? Support your answer. [1]

_____

_____

65 ☐

66 State *two* specific ways in which an ocean ecosystem will change (other than fewer photosynthetic organisms) if populations of photosynthetic organisms die off as a result of damage to the ozone layer. [2]

_____

_____

_____

_____

_____

66 ☐

67 Lawn wastes, such as grass clippings and leaves, were once collected with household trash and dumped into landfills. Identify *one* way that this practice was harmful to the environment. [1]

_____

_____

67 ☐

Part D

Answer all questions in this part. [13]

Directions (68–80): 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 Use Only

68 In preparation for an electrophoresis procedure, enzymes are added to DNA in order to

(1) convert the DNA into gel

(2) cut the DNA into fragments

(3) change the color of the DNA

(4) produce longer sections of DNA

68 ☐

69 Paper chromatography is a laboratory technique that is used to

(1) separate different molecules from one another

(2) stain cell organelles

(3) indicate the pH of a substance

(4) compare relative cell sizes

69 ☐

70 A marathon runner frequently experiences muscle cramps while running. If he stops running and rests, the cramps eventually go away. The cramping in the muscles most likely results from

(1) lack of adequate oxygen supply to the muscle

(2) the runner running too slowly

(3) the runner warming up before running

(4) increased glucose production in the muscle

70 ☐

Base your answers to questions 71 through 73 on the information below and on your knowledge of biology.

A series of investigations was performed on four different plant species. The results of these investigations are recorded in the data table below.

Characteristics of Four Plant Species

Plant Species	Seeds	Leaves	Pattern of Vascular Bundles (structures in stem)	Type of Chlorophyll Present
A	round/small	needle-like	scattered bundles	chlorophyll a and b
B	long/pointed	needle-like	circular bundles	chlorophyll a and c
C	round/small	needle-like	scattered bundles	chlorophyll a and b
D	round/small	needle-like	scattered bundles	chlorophyll b

71 Based on these data, which *two* plant species appear to be most closely related? Support your answer. [1]

Plant species _____ and _____

_____

_____ 71 ☐

72 What additional information could be gathered to support your answer to question 71? [1]

_____

_____ 72 ☐

73 State *one* reason why scientists might want to know if two plant species are closely related. [1]

_____

_____ 73 ☐

For Teacher Use Only

Base your answers to questions 74 and 75 on the data table below and on your knowledge of biology.

For Teacher Use Only

Dietary Preferences of Finches

Species of Finch	Preferred Foods
A	nuts and seeds
B	worms and insects
C	fruits and seeds
D	insects and seeds
E	nuts and seeds

74 Based on its preferred food, species *B* would be classified as a

(1) decomposer

(2) producer

(3) carnivore

(4) parasite

74 ☐

75 Which two species would most likely be able to live in the same habitat without competing with each other for food?

(1) *A* and *C*

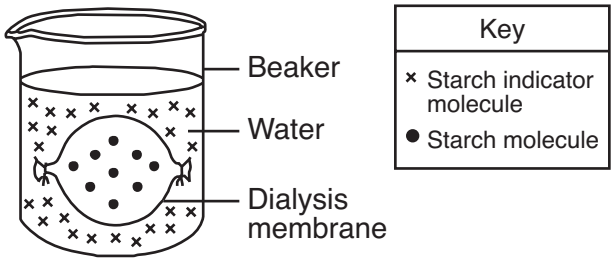
(2) *B* and *C*

(3) *B* and *D*

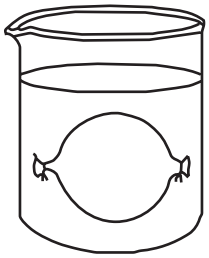
(4) *C* and *E*

75 ☐

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]

_____

_____

For Teacher Use Only

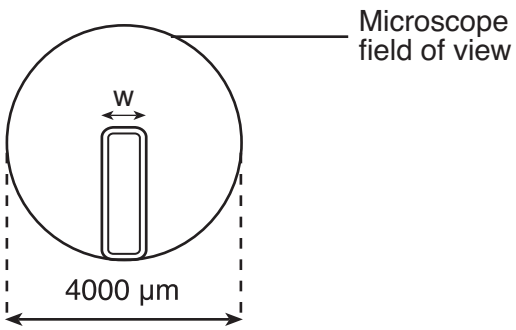
76 ☐

77 ☐

78 ☐

For Teacher Use Only

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

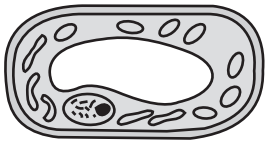
(2) 800 µm

(3) 1200 µm

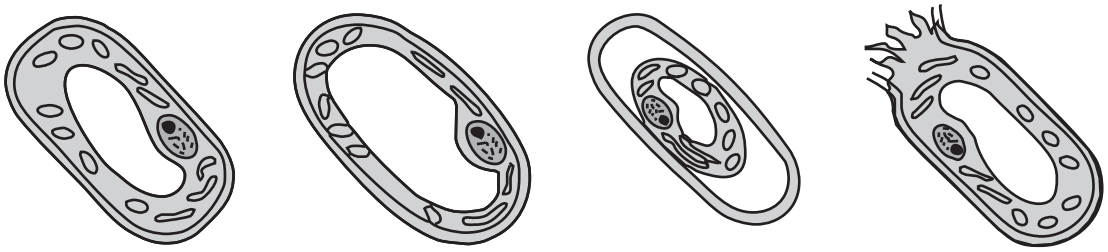
(4) 1600 µm

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?



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

80 ☐

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Tuesday, June 24, 2008 — 9:15 a.m. to 12:15 p.m., only

ANSWER SHEET

Student ..... Sex: ☐ Female ☐ Male

Teacher .....

School ..... Grade .....

Part	Maximum Score	Student's Score
A	30	
B–1	12	
B–2	13	
C	17	
D	13	

Total Raw Score (maximum Raw Score: 85) ☐

Final Score (from conversion chart) ☐

Raters' Initials

Rater 1 ..... Rater 2 .....

Record your answers to Part A and Part B–1 on this answer sheet.

Part A

1	11	21 .....
2	12	22 .....
3	13	23 .....
4	14	24 .....
5	15	25 .....
6	16	26 .....
7	17	27 .....
8	18	28 .....
9	19	29 .....
10	20	30 .....

Part A Score ☐

Part B–1

31	37 .....
32	38 .....
33	39 .....
34	40 .....
35	41 .....
36	42 .....

Part B–1 Score ☐

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.

Signature

Tear Here

LIVING ENVIRONMENT

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FOR TEACHERS ONLY

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

LE

LIVING ENVIRONMENT

Tuesday, June 24, 2008 — 9:15 a.m. to 12:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

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 http://www.emsc.nysed.gov/osa/ 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 and Part B–1
Allow 1 credit for each correct response.

Part A

1	**1**	11	**3**	21	**1**
2	**4**	12	**4**	22	**2**
3	**1**	13	**2**	23	**3**
4	**4**	14	**4**	24	**1**
5	**3**	15	**3**	25	**2**
6	**1**	16	**3**	26	**2**
7	**1**	17	**2**	27	**4**
8	**4**	18	**1**	28	**3**
9	**2**	19	**1**	29	**1**
10	**2**	20	**2**	30	**3**

Part B–1

31	**3**	37	**4**
32	**2**	38	**2**
33	**4**	39	**4**
34	**1**	40	**1**
35	**3**	41	**3**
36	**1**	42	**2**

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 http://www.emsc.nysed.gov/osa/ on Tuesday, June 24, 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.

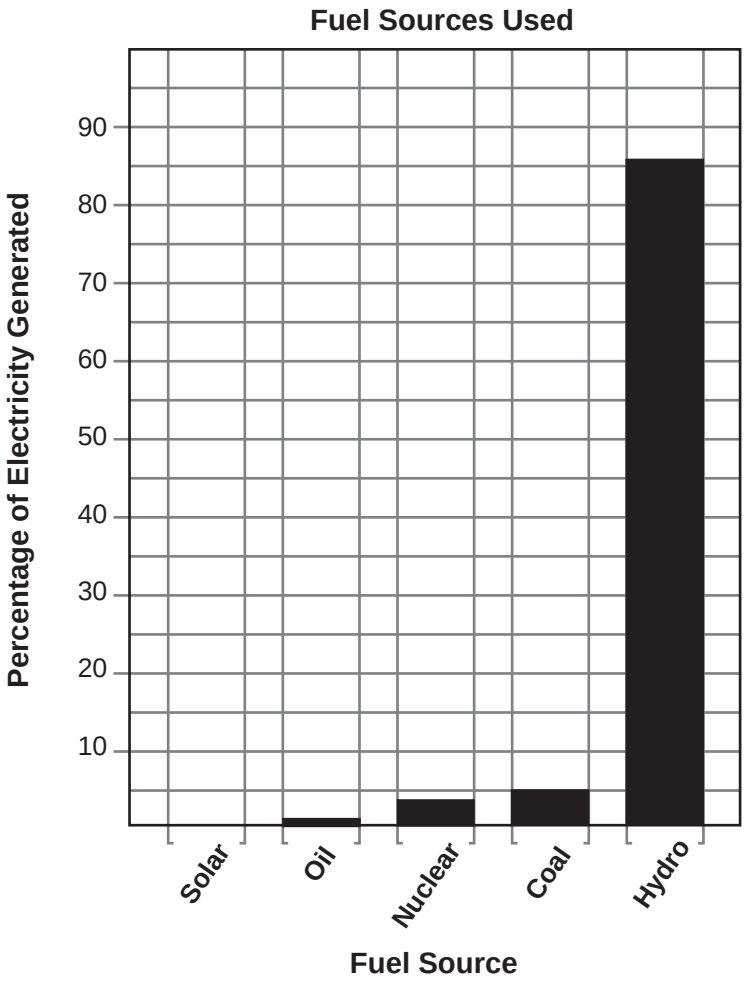
Because scaled scores corresponding to raw scores in the conversion chart may change from one examination to another, it is crucial that for each administration, the conversion chart provided for that administration be used to determine the student's final score.

Part B–2

43 [1] Allow 1 credit for marking an appropriate scale on the axis labeled "Percentage of Electricity Generated."

44 [1] Allow 1 credit for constructing vertical bars to represent the data.

Example of a 2-credit response for questions 43 and 44:



Note: Allow credit if the correct data are clearly represented, even if the bars are *not* shaded.

45 [1] Allow 1 credit for coal *or* oil.

46 [1] Allow 1 credit for hydro (water) *or* solar (Sun).

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

— Burning coal can produce air pollution *or* acid rain *or* global warming.

Note: Do *not* allow credit for ozone layer destruction or just pollution.

48 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The hawk population will decrease because there will be fewer snakes since there are fewer frogs for them to eat.
— The hawk population will increase because there will be more grasshoppers for the shrews to eat and more shrews for the hawks to eat.

49 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— chloroplast
— cell wall

50 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

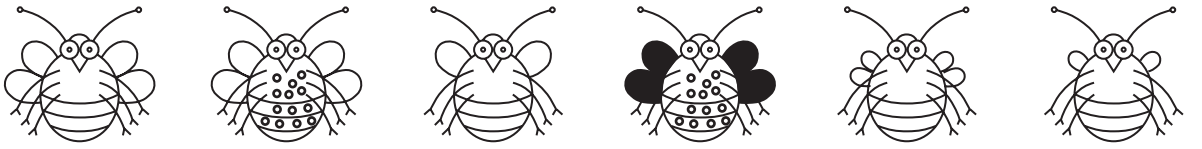
— Mating with another earthworm allows for variety in the species.
— better chances of survival due to variation or genetic recombination

51 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— 5. a. has white *or* clear *or* light wings
— 5. b. has shaded *or* black *or* dark wings

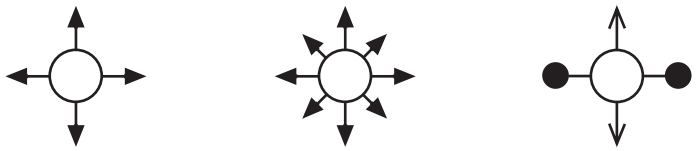
Note: Allow credit for any response that shows a distinction in wing shading.

52 [1] Allow 1 credit for correctly identifying the species, as shown below.



53 [1] Allow 1 credit for drawing one or more shapes on the virus that will fit with the receptor molecules on the human cell.

Examples of 1-credit responses:



54 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— mutation
— mutagenic agent that led to a new protein

55 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— parasite/host (parasitic)
— pathogen/host (pathogenic)

Part C

56 [1] Allow 1 credit for pancreas *or* Islets of Langerhans.

57 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— sugar
— glucose
— ketones

58 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— They can transfer pathogens to humans and domestic animals.
— Imported species may displace native species.
— increased competition for food and/or habitat for native species

59 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— make antibodies
— White blood cells will engulf and destroy pathogens.

60 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The coyote population will decrease, as the wolf will be a competitor for the same prey as the coyote.
— The coyote population will be unaffected because there is sufficient prey for both the wolf and the coyote.

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

— The coyotes control the growth of certain prey populations.

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

— The wolf was once a natural part of this ecosystem.
— to control the deer population
— There is adequate prey to support the wolf population.
— It would increase biodiversity.

63 [3] Allow a maximum of 3 credits, allocated as follows:

- Allow 1 credit for stating the hypothesis to be tested. Acceptable responses include, but are not limited to:

  — Tomato plants exposed to 16 hours of light will grow faster than those exposed to 8 hours of light.
  — Light affects plant growth.
  — A brighter light will cause the tomato plants to grow larger.

  Note: Do *not* allow credit for a hypothesis written in the form of a question.

- Allow 1 credit for identifying the independent variable in the experiment. Acceptable responses include, but are not limited to:

  — the amount of light
  — light
  — the intensity of the light

- Allow 1 credit for describing the type of data to be collected. Acceptable responses include, but are not limited to:

  — height of plants
  — number of leaves
  — size of leaves
  — mass of the plants
  — amount of growth

  Note: The type of data must be measurable.

64 [3] Allow a maximum of 3 credits, allocated as follows:

- Allow 1 credit for identifying *one* function regulated by the guard cells in leaves. Acceptable responses include but are not limited to:

  — gas exchange
  — respiration
  — photosynthesis

- Allow 1 credit for explaining how guard cells carry out this function. Acceptable responses include but are not limited to:

  — Guard cells change shape.
  — Guard cells change the size of the leaf openings.

- Allow 1 credit for giving *one* possible evolutionary advantage of the position of guard cells on the leaves of land plants. Acceptable responses include but are not limited to:

  — prevents excess evaporation of water on sunny days
  — prevents the entrance of some pollutants

65 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— No, mutations in body cells are not transmitted to offspring.
— No, only mutations in gametes are transmitted to offspring.

66 [2] Allow a maximum of 2 credits, 1 credit for each of *two* acceptable responses. Acceptable responses include, but are not limited to:

— decrease in consumers/biodiversity
— decrease in oxygen
— decrease in available energy
— increase in carbon dioxide

67 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— doesn't allow for recycling of nutrients in the lawn
— takes up landfill space

Part D

68 2

69 1

70 1

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

— *A* and *C*– most characteristics in common
— *A* and *C*– same type of chlorophyll present

72 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— structure of protein molecules
— types of enzymes present
— DNA sequences
— other physical characteristics

73 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

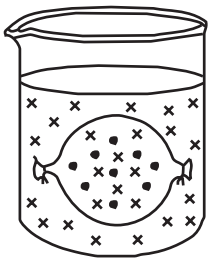
— Two related plants may produce similar substances that could be used for medicines.
— A related plant may provide a cheaper source of a substance.
— If a plant becomes extinct, a related plant may provide an alternative source of a substance.

74 3

75 2

76 [1] Allow 1 credit for drawing all the •s inside the membrane only, and drawing some of the **x**s inside and some outside the membrane.

Example of a 1-credit response:



Note: The starch indicator does *not* have to be evenly distributed.

77 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— A blue-black color would indicate the presence of starch.
— A color change would occur.

78 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Some molecules are too large to pass through the membrane.
— Some molecules are not soluble.
— the permeability of the membrane

79 2

80 3

The *Chart for Determining the Final Examination Score for the June 2008 Regents Examination in Living Environment* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Tuesday, June 24, 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.

Online Submission of 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 www.emsc.nysed.gov/osa/exameval/.
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

June 2008 Living Environment

Standards	Question Numbers			
	Part A 1–30	Part B–1 31–42	Part B–2 43–55	Part C 56–67
Standard 1 — Analysis, Inquiry and Design				
Key Idea 1		32		
Key Idea 2		33,34		63
Key Idea 3		39	43,44	
Appendix A (Laboratory Checklist)		31	51,52	
Standard 4				
Key Idea 1	1,2,4,5,9,25	35,36,42	48,53	
Key Idea 2	3,6,7,10,11,12	38	50	
Key Idea 3	8,13,14,16	40,41	54	65
Key Idea 4	17,18,21,22	37		
Key Idea 5	15,19,20,23		49	56,57,59,64
Key Idea 6	24,27,28		55	60,61,62,66
Key Idea 7	26,29,30		45,46,47	58,67

Part D 68–80	
Lab 1	68,69,71,72,73
Lab 2	70
Lab 3	74,75
Lab 5	76,77,78,79,80

University of the State of New York
State Education Department

Regents Examination in Living Environment
June 2008

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

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

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 scale score that corresponds to that raw score. The scale 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 scale 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 scale 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.