

LIVING ENVIRONMENT

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

LIVING ENVIRONMENT

Thursday, June 18, 2009 — 1:15 to 4:15 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.

Notice...

A four-function or scientific calculator must be made available for you to use while taking this examination.

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.

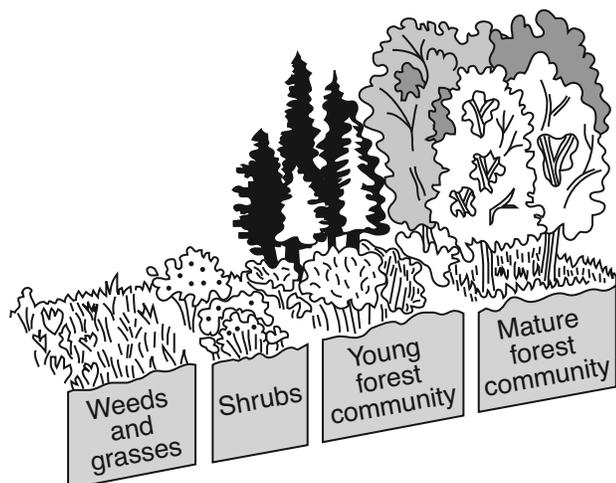
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part A

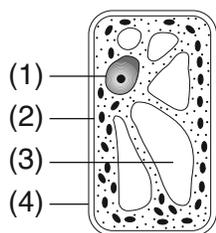
Answer all questions in this part. [30]

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 Which statement best describes one of the stages represented in the diagram below?

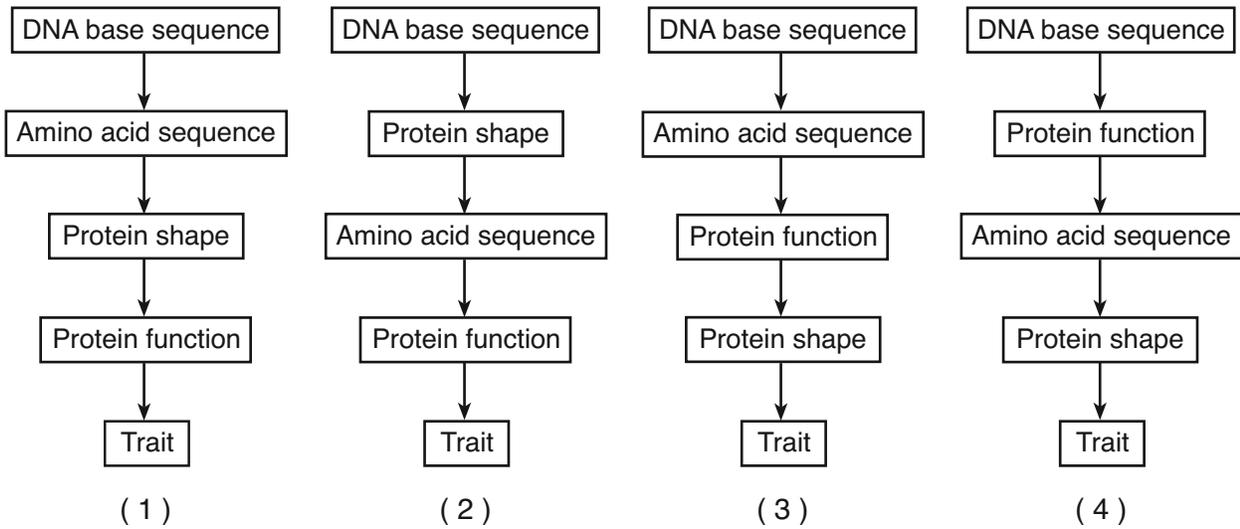


- (1) The mature forest will most likely be stable over a long period of time.
(2) If all the weeds and grasses are destroyed, the number of carnivores will increase.
(3) As the population of the shrubs increases, it will be held in check by the mature forest community.
(4) The young forest community will invade and take over the mature forest community.
- 2 Which organ system in humans is most directly involved in the transport of oxygen?
- (1) digestive (3) excretory
(2) nervous (4) circulatory
- 3 Which cell structure contains information needed for protein synthesis?



- 4 The human liver contains many specialized cells that secrete bile. Only these cells produce bile because
- (1) different cells use different parts of the genetic information they contain
(2) cells can eliminate the genetic codes that they do not need
(3) all other cells in the body lack the genes needed for the production of bile
(4) these cells mutated during embryonic development
- 5 Although identical twins inherit exact copies of the same genes, the twins may look and act differently from each other because
- (1) a mutation took place in the gametes that produced the twins
(2) the expression of genes may be modified by environmental factors
(3) the expression of genes may be different in males and females
(4) a mutation took place in the zygote that produced the twins
- 6 Which hormone does *not* directly regulate human reproductive cycles?
- (1) testosterone (3) insulin
(2) estrogen (4) progesterone
- 7 Owls periodically expel a mass of undigested material known as a pellet. A student obtained several owl pellets from the same location and examined the animal remains in the pellets. He then recorded the number of different prey animal remains in the pellets. The student was most likely studying the
- (1) evolution of the owl
(2) social structure of the local owl population
(3) role of the owl in the local ecosystem
(4) life cycle of the owl

8 Which sequence best represents the relationship between DNA and the traits of an organism?



9 A sequence of events associated with ecosystem stability is represented below.

sexual reproduction → genetic variation → biodiversity → ecosystem stability

The arrows in this sequence should be read as

- (1) leads to
- (2) reduces
- (3) prevents
- (4) simplifies

10 In some people, the lack of a particular enzyme causes a disease. Scientists are attempting to use bacteria to produce this enzyme for the treatment of people with the disease. Which row in the chart below best describes the sequence of steps the scientists would most likely follow?

Row	Step A	Step B	Step C	Step D
(1)	identify the gene	insert the gene into a bacterium	remove the gene	extract the enzyme
(2)	insert the gene into a bacterium	identify the gene	remove the gene	extract the enzyme
(3)	identify the gene	remove the gene	insert the gene into a bacterium	extract the enzyme
(4)	remove the gene	extract the enzyme	identify the gene	insert the gene into a bacterium

11 What will most likely occur as a result of changes in the frequency of a gene in a particular population?

- (1) ecological succession
- (2) biological evolution
- (3) global warming
- (4) resource depletion

12 The puppies shown in the photograph below are all from the same litter.



The differences seen within this group of puppies are most likely due to

- (1) overproduction and selective breeding
- (2) mutations and elimination of genes
- (3) evolution and asexual reproduction
- (4) sorting and recombination of genes

13 Carbon dioxide makes up less than 1 percent of Earth's atmosphere, and oxygen makes up about 20 percent. These percentages are maintained most directly by

- (1) respiration and photosynthesis
- (2) the ozone shield
- (3) synthesis and digestion
- (4) energy recycling in ecosystems

14 Which sequence represents the order of some events in human development?

- (1) zygote → sperm → tissues → egg
- (2) fetus → tissues → zygote → egg
- (3) zygote → tissues → organs → fetus
- (4) sperm → zygote → organs → tissues

15 A variety of plant produces small white fruit. A stem was removed from this organism and planted in a garden. If this stem grows into a new plant, it would most likely produce

- (1) large red fruit, only
- (2) large pink fruit, only
- (3) small white fruit, only
- (4) small red and small white fruit on the same plant

16 A mutation that can be inherited by offspring would result from

- (1) random breakage of chromosomes in the nucleus of liver cells
- (2) a base substitution in gametes during meiosis
- (3) abnormal lung cells produced by toxins in smoke
- (4) ultraviolet radiation damage to skin cells

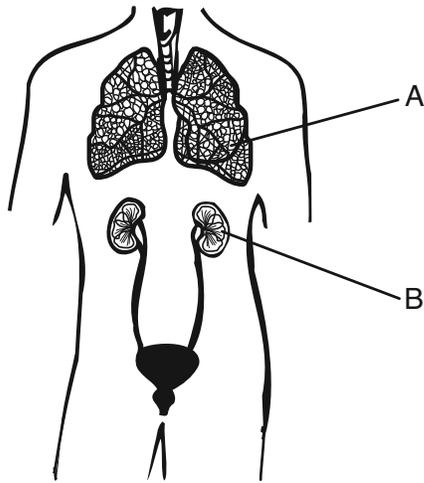
17 The diagram below represents a process that occurs in organisms.



Which row in the chart indicates what A and B in the boxes could represent?

Row	A	B
(1)	starch	proteins
(2)	starch	amino acids
(3)	protein	amino acids
(4)	protein	simple sugars

- 18 Some organs of the human body are represented in the diagram below.

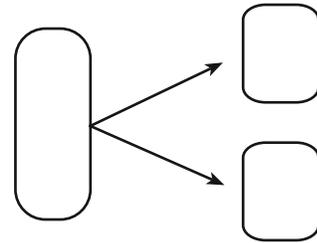


Which statement best describes the functions of these organs?

- (1) *B* pumps blood to *A* for gas exchange.
 - (2) *A* and *B* both produce carbon dioxide, which provides nutrients for other body parts.
 - (3) *A* releases antibodies in response to an infection in *B*.
 - (4) The removal of wastes from both *A* and *B* involves the use of energy from ATP.
- 19 *Salmonella* bacteria can cause humans to have stomach cramps, vomiting, diarrhea, and fever. The effect these bacteria have on humans indicates that *Salmonella* bacteria are
- (1) predators
 - (2) pathogenic organisms
 - (3) parasitic fungi
 - (4) decomposers
- 20 The virus that causes AIDS is damaging to the body because it
- (1) targets cells that fight invading microbes
 - (2) attacks specific red blood cells
 - (3) causes an abnormally high insulin level
 - (4) prevents the normal transmission of nerve impulses

- 21 In the leaf of a plant, guard cells help to
- (1) destroy atmospheric pollutants when they enter the plant
 - (2) regulate oxygen and carbon dioxide levels
 - (3) transport excess glucose to the roots
 - (4) block harmful ultraviolet rays that can disrupt chlorophyll production

- 22 An antibiotic is effective in killing 95% of a population of bacteria that reproduce by the process shown below.

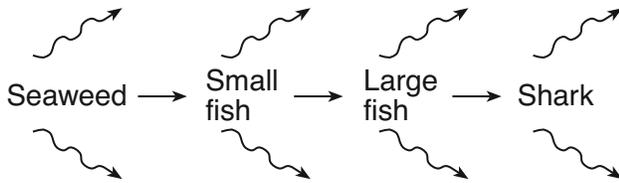


Which statement best describes future generations of these bacteria?

- (1) They will be produced by asexual reproduction and will be more resistant to the antibiotic.
 - (2) They will be produced by sexual reproduction and will be more resistant to the antibiotic.
 - (3) They will be produced by asexual reproduction and will be just as susceptible to the antibiotic.
 - (4) They will be produced by sexual reproduction and will be just as susceptible to the antibiotic.
- 23 The size of plant populations can be influenced by the
- (1) molecular structure of available oxygen
 - (2) size of the cells of decomposers
 - (3) number of chemical bonds in a glucose molecule
 - (4) type of minerals present in the soil

- 24 Competition between two species occurs when
- (1) mold grows on a tree that has fallen in the forest
 - (2) chipmunks and squirrels eat sunflower seeds in a garden
 - (3) a crow feeds on the remains of a rabbit killed on the road
 - (4) a lion stalks, kills, and eats an antelope

25 A food chain is illustrated below.

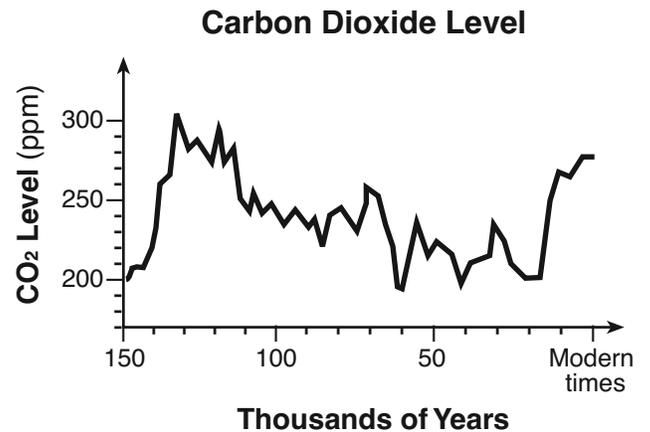


The arrows represented as most likely indicate

- (1) energy released into the environment as heat
 - (2) oxygen produced by respiration
 - (3) the absorption of energy that has been synthesized
 - (4) the transport of glucose away from the organism
- 26 If several species of carnivores are removed from an ecosystem, the most likely effect on the ecosystem will be
- (1) an increase in the kinds of autotrophs
 - (2) a decrease in the number of abiotic factors
 - (3) a decrease in stability among populations
 - (4) an increase in the rate of succession
- 27 Some people make compost piles consisting of weeds and other plant materials. When the compost has decomposed, it can be used as fertilizer. The production and use of compost is an example of
- (1) the introduction of natural predators
 - (2) the use of fossil fuels
 - (3) the deforestation of an area
 - (4) the recycling of nutrients

- 28 Which statement best describes a chromosome?
- (1) It is a gene that has thousands of different forms.
 - (2) It has genetic information contained in DNA.
 - (3) It is a reproductive cell that influences more than one trait.
 - (4) It contains hundreds of genetically identical DNA molecules.

29 The graph below shows how the level of carbon dioxide in the atmosphere has changed over the last 150,000 years.



Which environmental factor has been most recently affected by these changes in carbon dioxide level?

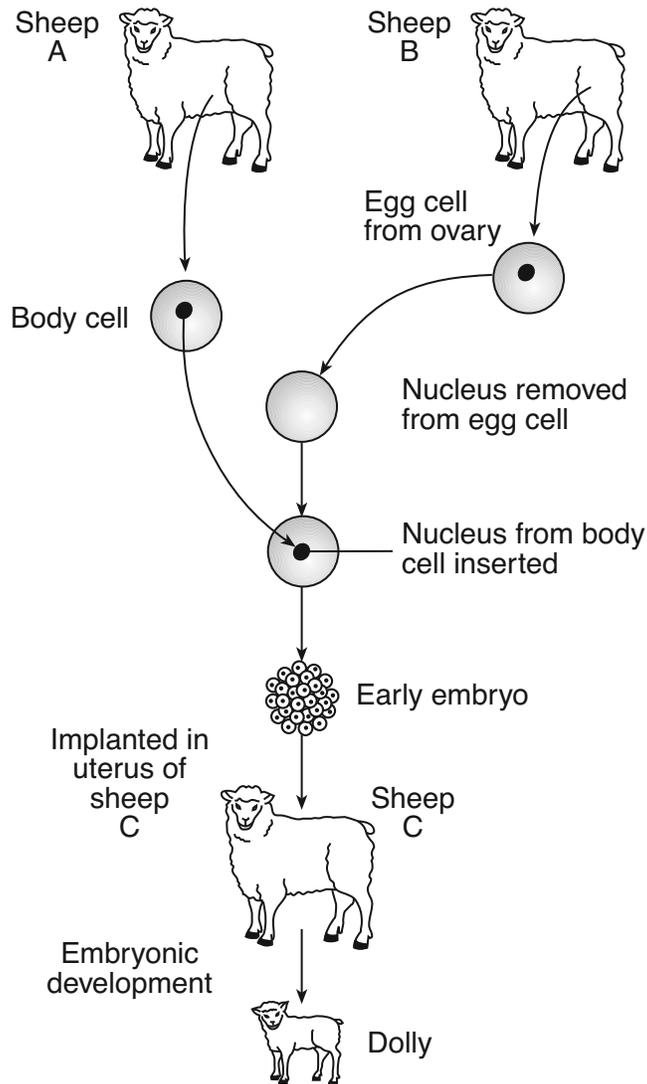
- (1) light intensity
 - (2) types of decomposers
 - (3) size of consumers
 - (4) atmospheric temperature
- 30 One reason why people should be aware of the impact of their actions on the environment is that
- (1) ecosystems are never able to recover once they have been adversely affected
 - (2) the depletion of finite resources cannot be reversed
 - (3) there is a decreased need for new technology
 - (4) there is a decreased need for substances produced by natural processes

Part B-1

Answer all questions in this part. [11]

Directions (31–41): 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.

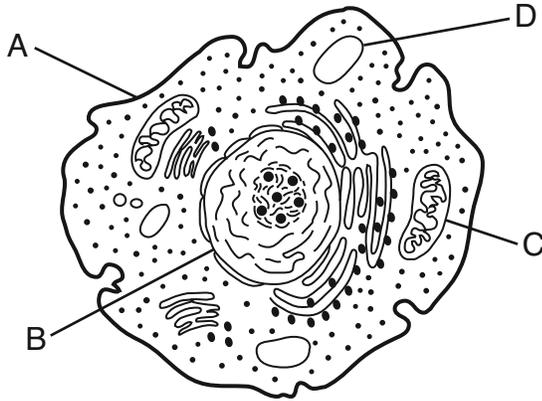
31 The diagram below represents the process used in 1996 to clone the first mammal, a sheep named Dolly.



Which statement concerning Dolly is correct?

- (1) Gametes from sheep A and sheep B were united to produce Dolly.
- (2) The chromosome makeup of Dolly is identical to that of sheep A.
- (3) Both Dolly and sheep C have identical DNA.
- (4) Dolly contains genes from sheep B and sheep C.

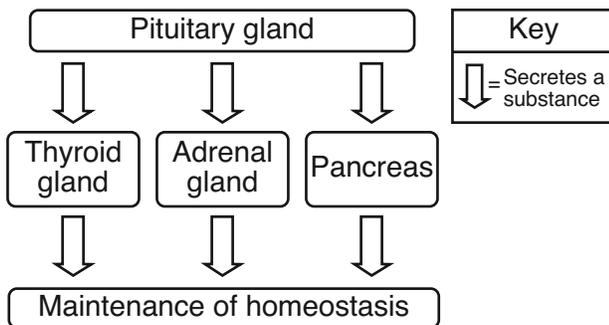
32 The diagram below represents a cell.



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

- (1) The absorption of ATP occurs at structure A.
- (2) The synthesis of ATP occurs within structure B.
- (3) ATP is produced most efficiently by structure C.
- (4) The template for ATP is found in structure D.

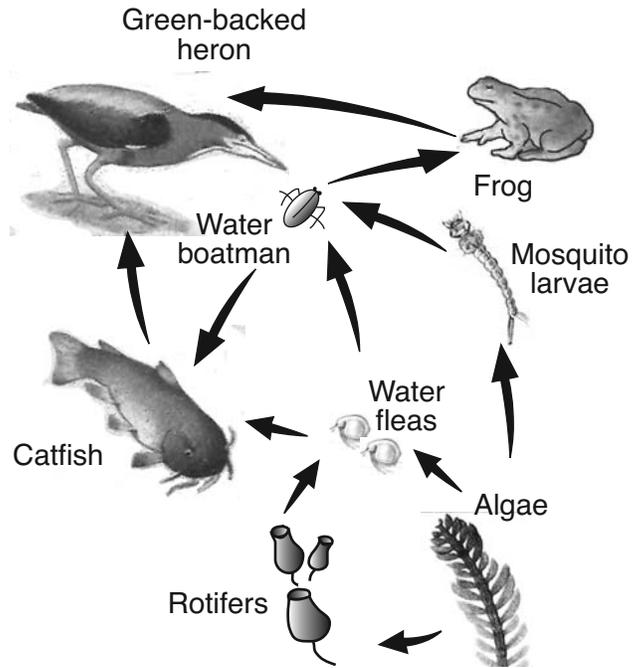
33 The diagram below illustrates some functions of the pituitary gland. The pituitary gland secretes substances that, in turn, cause other glands to secrete different substances.



Which statement best describes events shown in the diagram?

- (1) Secretions provide the energy needed for metabolism.
- (2) The raw materials for the synthesis of secretions come from nitrogen.
- (3) The secretions of all glands speed blood circulation in the body.
- (4) Secretions help the body to respond to changes from the normal state

34 A pond ecosystem is shown in the diagram below.

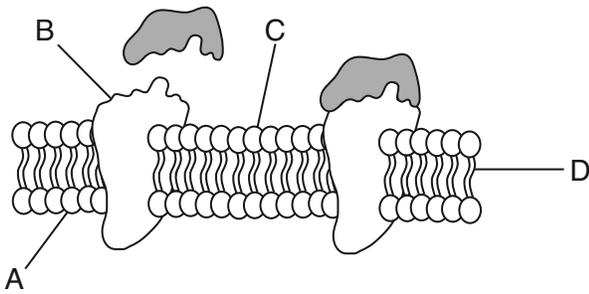


(Not drawn to scale)

Which statement describes an interaction that helps maintain the dynamic equilibrium of this ecosystem?

- (1) The frogs make energy available to this ecosystem through the process of photosynthesis.
- (2) The algae directly provide food for both the rotifers and the catfish.
- (3) The green-backed heron provides energy for the mosquito larvae.
- (4) The catfish population helps control the populations of water boatman and water fleas.

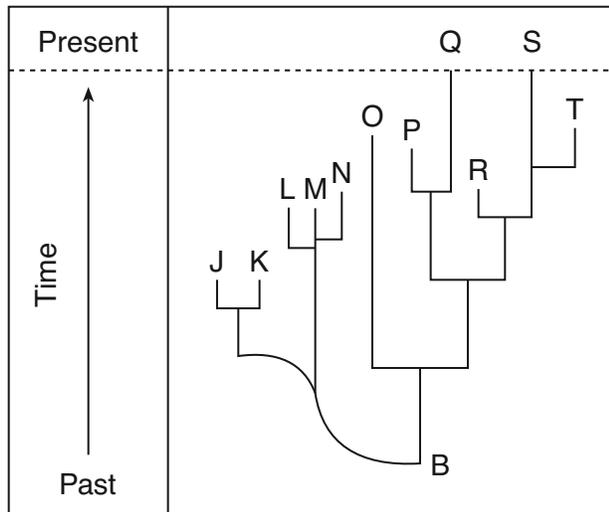
35 The diagram below represents a portion of a cell membrane.



Which structure may function in the recognition of chemical signals?

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

36 Some evolutionary pathways are represented in the diagram below.



An inference that can be made from information in the diagram is that

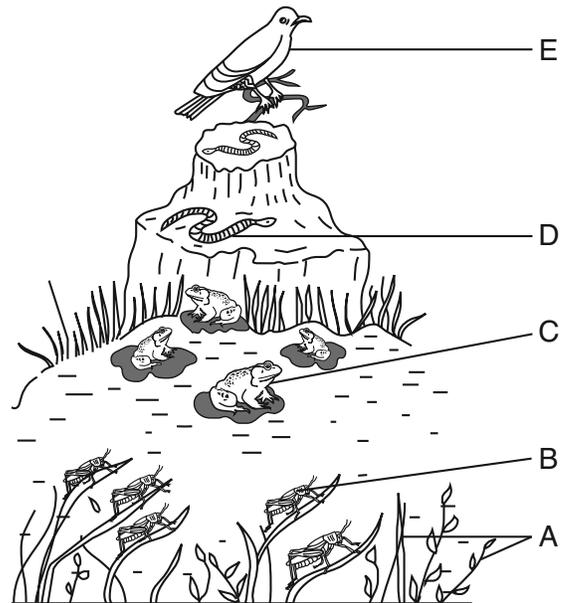
- (1) many of the descendants of organism B became extinct
 (2) organism B was probably much larger than any of the other organisms represented
 (3) most of the descendants of organism B successfully adapted to their environment and have survived to the present time
 (4) the letters above organism B represent members of a single large population with much biodiversity

37 Which species in the chart below is most likely to have the fastest rate of evolution?

Species	Reproductive Rate	Environment
A	slow	stable
B	slow	changing
C	fast	stable
D	fast	changing

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

Base your answers to questions 38 and 39 on the diagram below that represents an energy pyramid in a meadow ecosystem and on your knowledge of biology.



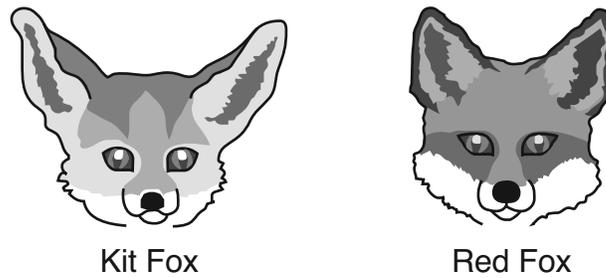
38 Which species would have the largest amount of available energy in this ecosystem?

- (1) A (2) B (3) C (4) E

39 Which two organisms are carnivores?

- (1) A and B (2) A and E (3) B and D (4) C and E

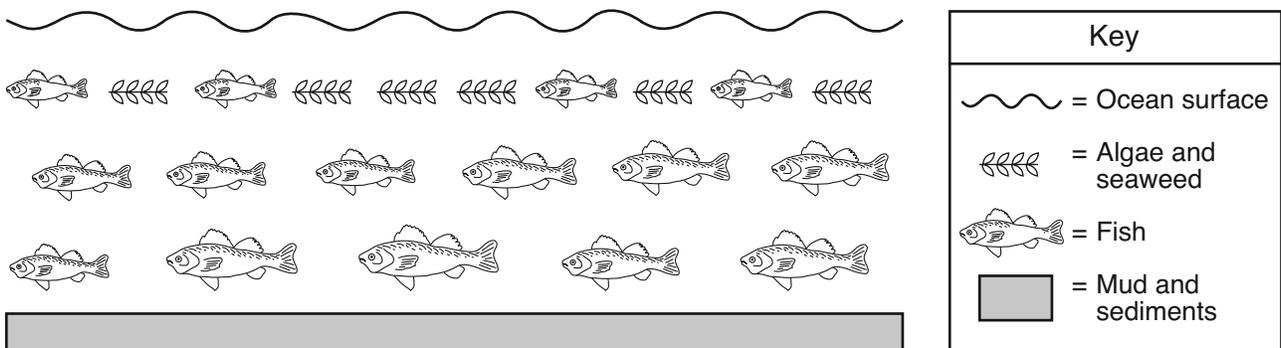
40 The kit fox and red fox species are closely related. The kit fox lives in the desert, while the red fox inhabits forests. Ear size and fur color are two differences that can be observed between the species. An illustration of these two species is shown below.



Which statement best explains how the differences between these two species came about?

- (1) Different adaptations developed because the kit fox preferred hotter environments than the red fox.
- (2) As the foxes adapted to different environments, differences in appearance evolved.
- (3) The foxes evolved differently to prevent overpopulation of the forest habitat.
- (4) The foxes evolved differently because their ancestors were trying to avoid competition.

41 An ecosystem is represented below.



The organisms represented as are found in the area shown due to which factor?

- (1) pH
- (2) sediment
- (3) light intensity
- (4) colder temperature

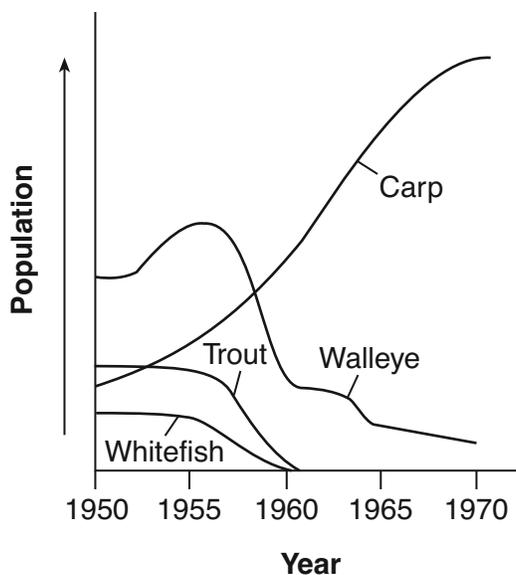
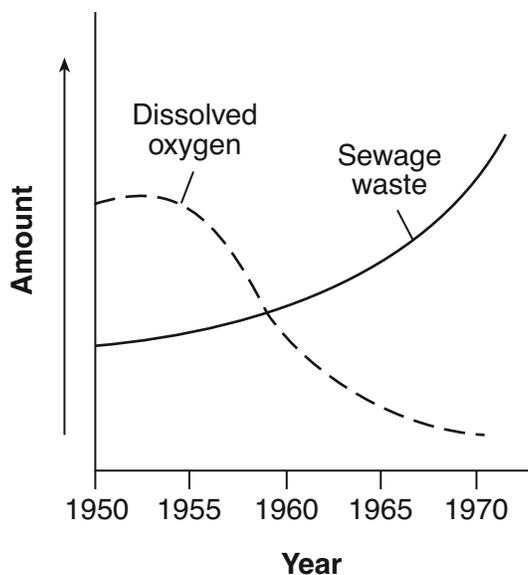
Part B-2

Answer all questions in this part. [14]

Directions (42-51): For those questions that are followed by four choices, circle the *number* preceding 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.

42 The graphs below show dissolved oxygen content, sewage waste content, and fish populations in a lake between 1950 and 1970.

For Teacher Use Only



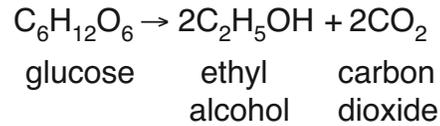
State what happened to the amount of dissolved oxygen and the number of fish species as the amount of sewage waste increased. [1]

42

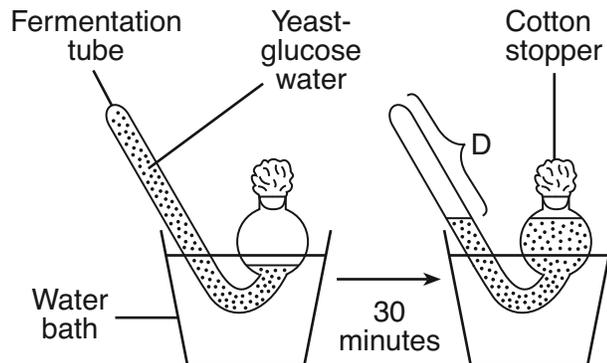
Base your answers to questions 43 through 46 on the information below and on your knowledge of biology.

**For Teacher
Use Only**

Yeast cells carry out the process of cellular respiration as shown in the equation below.



An investigation was carried out to determine the effect of temperature on the rate of cellular respiration in yeast. Five experimental groups, each containing five fermentation tubes, were set up. The fermentation tubes all contained the same amounts of water, glucose, and yeast. Each group of five tubes was placed in a water bath at a different temperature. After 30 minutes, the amount of gas produced (*D*) in each fermentation tube was measured in milliliters. The average for each group was calculated. A sample setup and the data collected are shown below.



**Average Amount of Gas Produced (*D*)
After 30 Minutes at Various Temperatures**

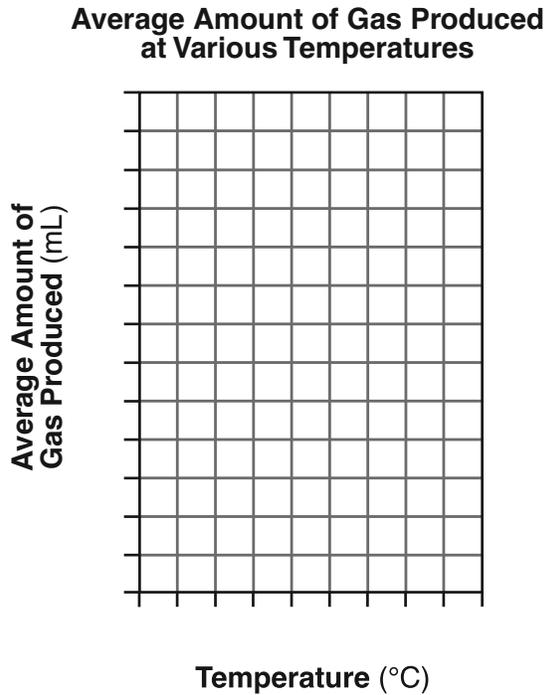
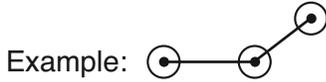
Group	Temperature (°C)	D (mL)
1	5	0
2	20	5
3	40	12
4	60	6
5	80	3

Directions (43 and 44): Using the information in the data table, construct a line graph on the grid below, following the directions below.

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

44 Plot the data from the data table. Surround each point with a small circle, and connect the points. [1]



43

44

45 The maximum rate of cellular respiration in yeast occurred at which temperature?

- (1) 5°C
- (2) 20°C
- (3) 40°C
- (4) 60°C

45

46 Compared to the other tubes at the end of 30 minutes, the tubes in group 3 contained the

- (1) smallest amount of CO₂
- (2) smallest amount of glucose
- (3) smallest amount of ethyl alcohol
- (4) same amounts of glucose, ethyl alcohol, and CO₂

46

Base your answers to questions 47 through 49 on the information below and on your knowledge of biology.

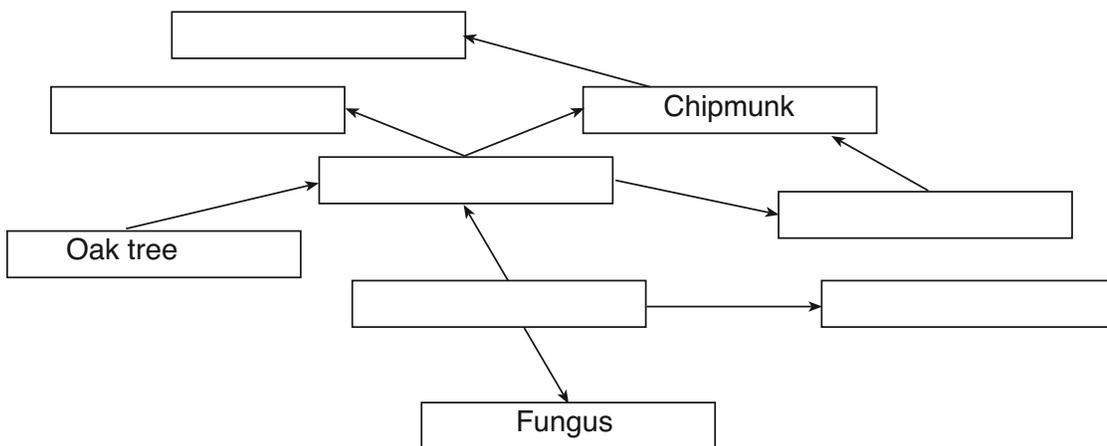
**For Teacher
Use Only**

An ecologist made some observations in a forest ecosystem over a period of several days. Some of the data collected are shown in the table below.

Observations in a Forest Environment

Date	Observed Feeding Relationships	Ecosystem Observations
6/2	<ul style="list-style-type: none"> • white-tailed deer feeding on maple tree leaves • woodpecker feeding on insects • salamander feeding on insects 	<ul style="list-style-type: none"> • 2 cm of rain in 24 hours
6/5	<ul style="list-style-type: none"> • fungus growing on a maple tree • insects feeding on oak trees 	<ul style="list-style-type: none"> • several types of sedimentary rock are in the forest
6/8	<ul style="list-style-type: none"> • woodpecker feeding on insects • red-tailed hawk feeding on chipmunk 	<ul style="list-style-type: none"> • air contains 20.9% oxygen
6/11	<ul style="list-style-type: none"> • chipmunk feeding on insects • insect feeding on maple tree leaves • chipmunk feeding on a small salamander 	<ul style="list-style-type: none"> • soil contains phosphorous

47 On the diagram below, complete the food web by placing the names of *all* the organisms in the correct locations. [1]



47

48 Identify *one* producer recorded by the ecologist in the data table. [1]

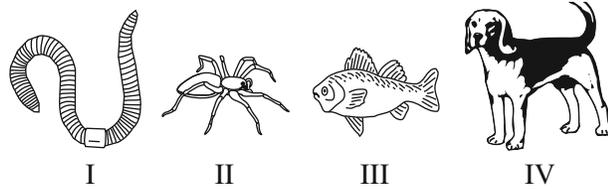
48

49 Which statement describes how one biotic factor of the forest uses one of the abiotic factors listed in the data table?

- (1) Trees absorb water as a raw material for photosynthesis.
- (2) Insects eat and digest the leaves of trees.
- (3) Erosion of sedimentary rock adds phosphorous to the soil.
- (4) Fungi release oxygen from the trees back into the air.

49

50 Fill in all of the blanks in parts 2 and 3 of the dichotomous key below, so that it contains information that could be used to identify the four animals shown below. [2]



Dichotomous Key

- 1. a. Legs present..... Go to 2
- b. Legs not present..... Go to 3

Characteristic

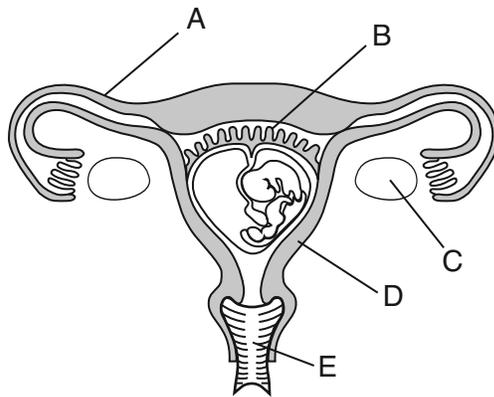
Organism

- 2. a. _____
- b. _____
- 3. a. _____
- b. _____

50

51 The human female reproductive system is represented in the diagram below.

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Use Only**



Complete boxes 1 through 4 in the chart below using the information from the diagram. [4]

Name of Structure	Letter on Diagram	Function of Structure
1 _____	2 _____	produces gametes
uterus	D	3 _____
4 _____	B	transports oxygen directly to the embryo

51

Base your answer to question 54 on the article below and on your knowledge of biology.

**For Teacher
Use Only**

Power plan calls for windmills off beach

The Associated Press

Several dozen windmills taller than the Statue of Liberty will crop up off Long Island — the first source of off-shore wind power outside of Europe, officials said.

The Long Island Power Authority [LIPA] expects to choose a company to build and operate between 35 and 40 windmills in the Atlantic Ocean off Jones Beach, The New York Times reported Sunday [May 2, 2004]. Cost and completion date are unknown.

Energy generated by the windmills would constitute about 2 percent of LIPA's total power use. They are expected to produce 100 to 140 megawatts, enough to power 30,000 homes....

But some Long Island residents oppose the windmills, which they fear will create noise, interfere with fishing, and mar ocean views....

Source: "Democrat and Chronicle", Rochester, NY 5/3/04

54 State *two* ways that the use of windmills to produce energy would be beneficial to the environment. [2]

- (1) _____
- (2) _____

54

55 Importing a foreign species, either intentionally or by accident, can alter the balance of an ecosystem. State *one* specific example of an imported species that has altered the balance of an ecosystem and explain how it has disrupted the balance in that ecosystem. [2]

- _____
- _____
- _____

55

Base your answers to questions 56 through 59 on the passage below and on your knowledge of biology.

**For Teacher
Use Only**

Avian (Bird) Flu

Avian flu virus H5N1 has been a major concern recently. Most humans have not been exposed to this strain of the virus, so they have not produced the necessary protective substances. A vaccine has been developed and is being made in large quantities. However, much more time is needed to manufacture enough vaccine to protect most of the human population of the world.

Most flu virus strains affect the upper respiratory tract, resulting in a runny nose and sore throat. However, the H5N1 virus seems to go deeper into the lungs and causes severe pneumonia, which may be fatal for people infected by this virus.

So far, this virus has not been known to spread directly from one human to another. As long as H5N1 does not change to another strain that can be transferred from one human to another, a worldwide epidemic of the virus probably will not occur.

56 State *one* difference between the effect on the human body of the usual forms of flu virus and the effect of H5N1. [1]

56

57 Identify the type of substance produced by the human body that protects against antigens, such as the flu virus. [1]

57

58 State what is in a vaccine that makes the vaccine effective. [1]

58

59 Identify *one* event that could result in the virus changing to a form able to spread from human to human. [1]

59

Part D

Answer all questions in this part. [13]

Directions (60–72): 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.

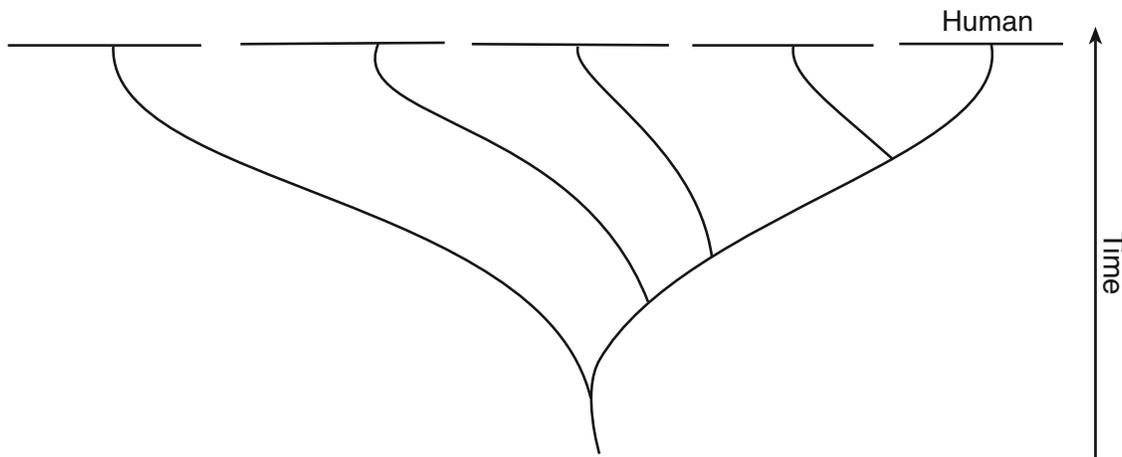
60 The data table below shows the number of amino acid differences in the hemoglobin molecules of several species compared with amino acids in the hemoglobin of humans.

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Amino Acid Differences

Species	Number of Amino Acid Differences
human	0
frog	67
pig	10
gorilla	1
horse	26

Based on the information in the data table, write the names of the organisms from the table in their correct positions on the evolutionary tree below. [1]



60

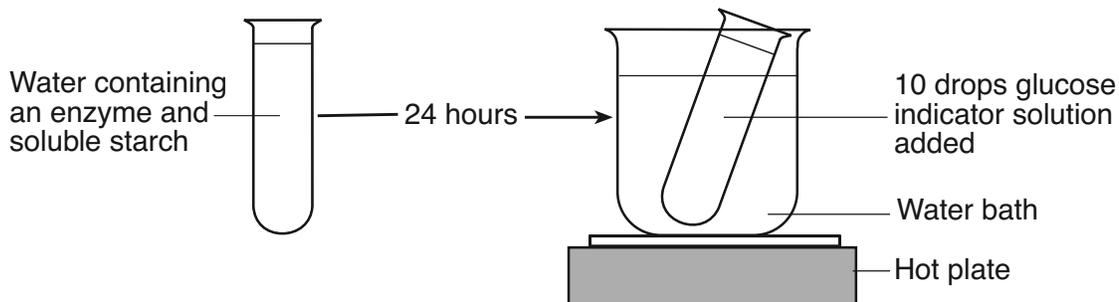
61 Explain why comparing the vein patterns of several leaves is a less reliable means of determining the evolutionary relationship between two plants than using gel electrophoresis. [1]

61

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

**For Teacher
Use Only**

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

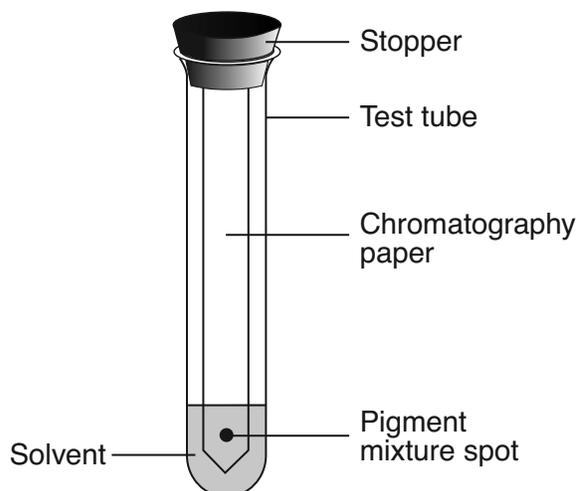


62 The test was performed in order to

- (1) measure the quantity of fat that is converted to starch
- (2) determine if digestion took place
- (3) evaporate the water from the test tube
- (4) cause the enzyme to bond to the water

62

63 A chromatography setup is shown below.



Identify *one* error in the setup. [1]

63

Base your answers to questions 64 through 66 on the information and data table below and on your knowledge of biology.

**For Teacher
Use Only**

During a laboratory activity, a group of students obtained the data shown below.

Pulse Rate Before and After Exercise

Student Tested	Pulse Rate at Rest (beats/min)	Pulse Rate After Exercise (beats/min)
A	70	97
B	74	106
C	83	120
D	60	91
E	78	122
Group Average		107

64 Which procedure would increase the validity of the conclusions drawn from the results of this experiment?

- (1) increasing the number of times the activity is repeated
- (2) changing the temperature in the room
- (3) decreasing the number of students participating in the activity
- (4) eliminating the rest period before the resting pulse rate is taken

64

65 Calculate the group average for the resting pulse rate. [1]

_____ **beats/min**

65

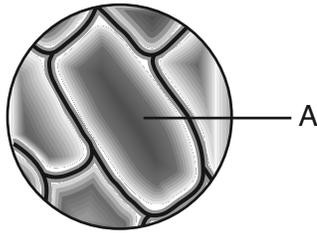
66 A change in pulse rate is related to other changes in the body. Write the name of *one* organ that is affected when a person runs a mile and describe *one* change that occurs in this organ. [1]

Organ: _____

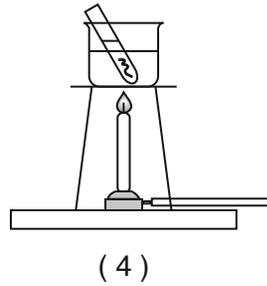
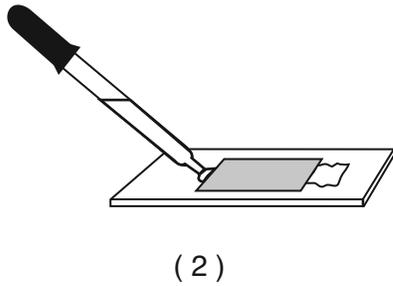
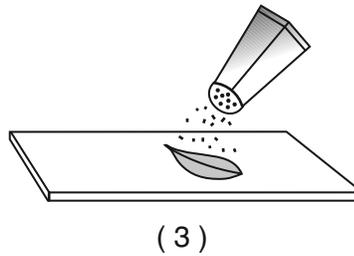
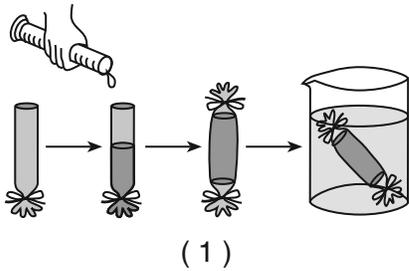
66

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

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

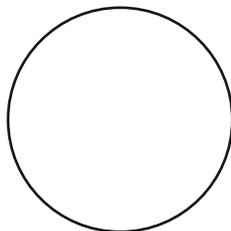


67 Which diagram best illustrates the technique that would most likely be used to add salt to these cells?



67

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



68

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

- (1) starch indicator
 - (2) dialysis tubing
 - (3) glucose indicator solution
 - (4) distilled water
-

**For Teacher
Use Only**

69

70 DNA electrophoresis is used to study evolutionary relationships of species. The diagram below shows the results of DNA electrophoresis for four different animal species.

Species A	Species X	Species Y	Species Z
—	—	— —	— —
—	— —	—	— — —
— —	—	— —	—

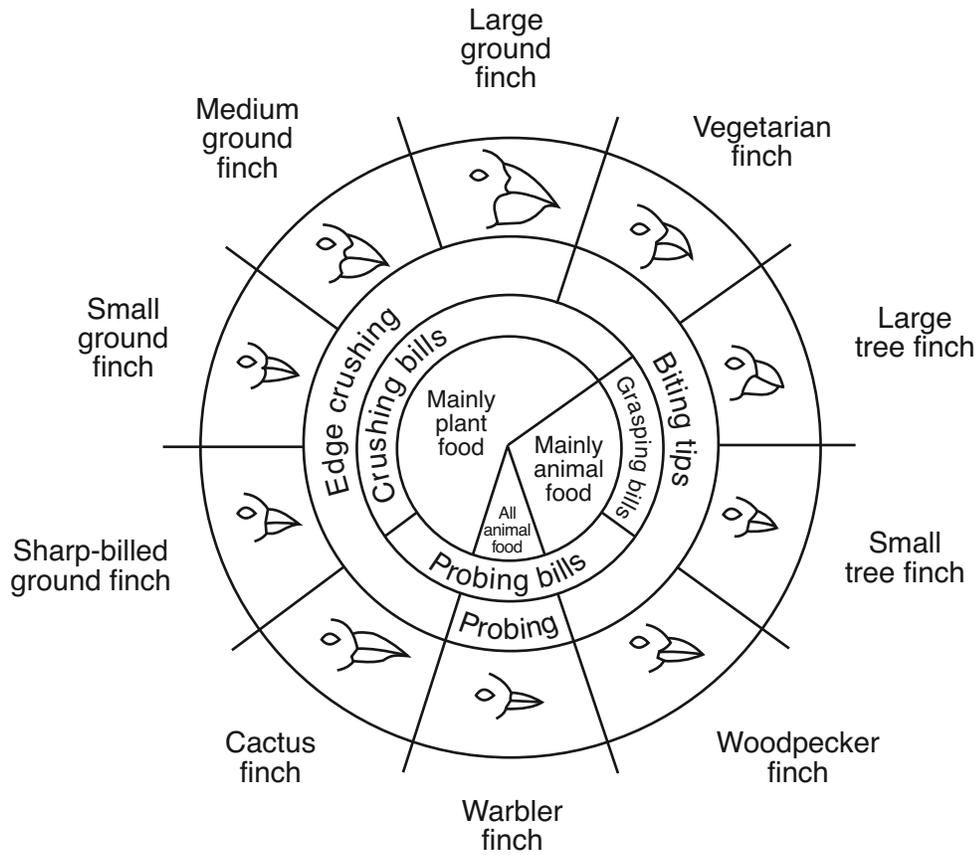
Which species has the most DNA in common with species A?

- (1) X and Y, only
- (2) Y, only
- (3) Z, only
- (4) X, Y, and Z

70

Base your answers to questions 71 and 72 on the diagram below that shows variations in the beaks of finches in the Galapagos Islands and on your knowledge of biology.

For Teacher Use Only



From: *Galapagos: A Natural History Guide*

71 The diversity of species seen on the Galapagos Islands is mostly due to

- (1) gene manipulation by scientists
- (2) gene changes resulting from mitotic cell division
- (3) natural selection
- (4) selective breeding

71

72 State *one* reason why large ground finches and large tree finches can coexist on the same island. [1]

72

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Thursday, June 18, 2009 — 1:15 to 4:15 p.m., only

ANSWER SHEET

Female

Student Sex: Male

Teacher

School Grade

Part	Maximum Score	Student's Score
A	30	
B-1	11	
B-2	14	
C	17	
D	13	
Total Raw Score (maximum Raw Score: 85)		<input type="text"/>
Final Score (from conversion chart)		<input type="text"/>
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 | |

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

Tear Here

Tear Here

LIVING ENVIRONMENT

FOR TEACHERS ONLY

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

LE

LIVING ENVIRONMENT

Thursday, June 18, 2009 — 1:15 to 4:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 2 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			Part B-1	
11	112	212	312	374
24	124	221	323	381
31	131	234	334	394
41	143	242	344	402
52	153	251	352	413
63	162	263	361	
73	173	274		
81	184	282		
91	192	294		
103	201	302		

LIVING ENVIRONMENT – *continued*

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 check mark 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 Thursday, June 18, 2009. 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

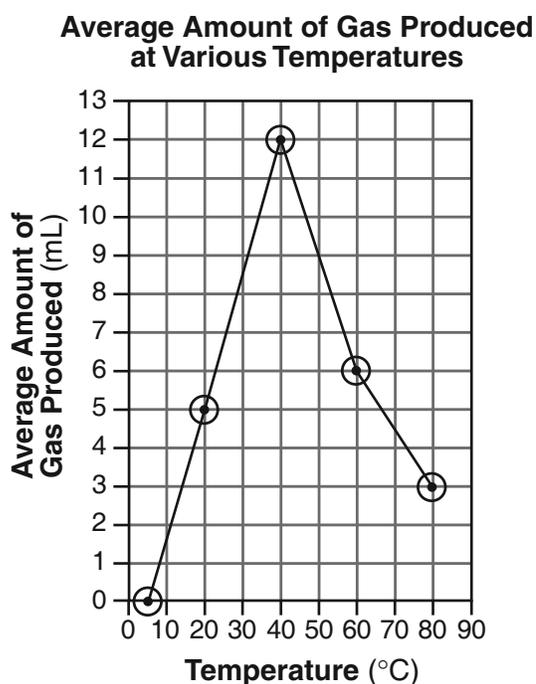
42 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— both decreased

43 [1] Allow 1 credit for marking an appropriate scale on each labeled axis.

44 [1] Allow 1 credit for correctly plotting the data and connecting the points.

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



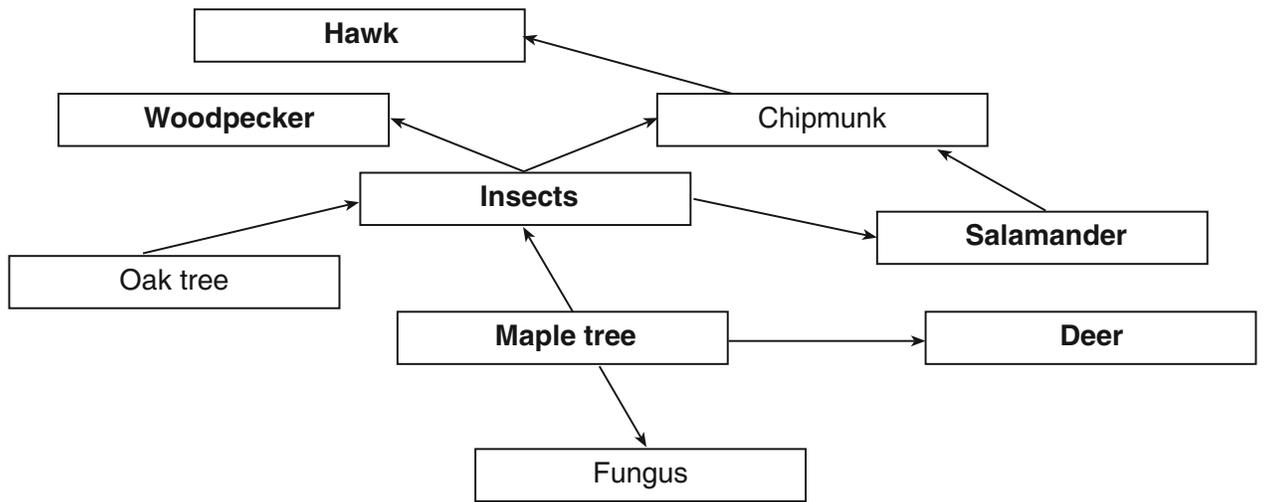
Note: Allow credit if the points are plotted correctly but not circled.
Make no assumption about the origin unless it is labeled.
Do *not* allow credit for plotting points that are not in the data table, e.g., (0,0).

45 3

46 2

47 [1] Allow 1 credit.

Example of a 1-credit response:



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

- maple tree
- tree
- oak

49 1

50 [2] Allow a maximum of 2 credits, 1 credit for correctly completing 2*a* and *b* and 1 credit for correctly completing 3*a* and *b*.

Example of a 2-credit response:

Dichotomous Key

- 1. a. Legs present.....Go to 2
- b. Legs not present.....Go to 3
- 2. a. **Four legs**.....**IV (Dog)**
- b. **Eight legs**.....**II (Spider)**
- 3. a. **Fins present****III (Fish)**
- b. **Fins not present or segments present**.....**I (Earthworm)**

51 [4] Allow a maximum of 4 credits, 1 credit for each correct response in the chart.

Example of a 4-credit response:

Name of Structure	Letter on Diagram	Function of Structure
ovary	C	produces gametes
uterus	D	site of internal development
placenta	B	transports oxygen directly to the embryo

Part C

52 [4] Allow a maximum of 4 credits, allocated as follows:

- Allow 1 credit for identifying *one* human activity that could release chemicals harmful to the environment. Acceptable responses include, but are not limited to:
 - burning fossil fuels
 - dumping toxic wastes

- Allow 1 credit for identifying the chemical released by that activity. Acceptable responses include, but are not limited to:
 - CO₂ /sulfur dioxide/nitrogen gases
 - heavy metals

Note: Do *not* allow credit for pollution.

- Allow 1 credit for stating *one* effect the release of this chemical would most likely have on future ecosystems. Acceptable responses include, but are not limited to:
 - may increase global warming/acid rain
 - cause mutations

- Allow 1 credit for stating *one* way in which humans can reduce the production of this chemical to lessen its effect on future ecosystems. Acceptable responses include, but are not limited to:
 - use alternative fuels (solar *or* wind *or* water)
 - increase/enforce legislation that regulates the disposal of toxic wastes

53 [5] Allow a maximum of 5 credits, allocated as follows:

- Allow 1 credit for stating the hypothesis the experiment would test. Acceptable responses include, but are not limited to:

- Acid rain will cause a decrease in the number of seeds that germinate.

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

- Allow 1 credit for stating how the control group would be treated differently from the experimental group. Acceptable responses include, but are not limited to:

- The control group would be watered with water at pH 7, while the experimental groups would be watered with water at pH less than 7.

- Allow 1 credit for stating *two* factors that must be kept the same in both the experimental and the control group. Acceptable responses include, but are not limited to:

- same soil
- same temperature
- same type of plants (seeds)
- fertilizer use
- amount of water

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

- pH of water

- Allow 1 credit for correctly labeling the columns on the data table.

Example of a 1-credit response:

Data Table

pH	Number of Seeds that Germinate

LIVING ENVIRONMENT – *continued*

54 [2] Allow a maximum of 2 credits, 1 credit for each of *two* ways that the use of these windmills to produce energy would be beneficial to the environment. Acceptable responses include, but are not limited to:

- no air pollution from windmills
- burn less oil/coal
- Wind is a renewable resource.

55 [2] Allow a maximum of 2 credits, 1 credit for stating *one* specific example of an imported species that has altered the balance of an ecosystem and 1 credit for explaining how it has disrupted the balance in that ecosystem.

Examples of 2-credit responses:

- Zebra mussels outcompete native species for food, causing native species to decline in numbers.
- Purple loosestrife has crowded out native plants, leaving many native animals with much less available food, since they cannot eat the purple loosestrife.
- Rabbits in Australia ate much of the vegetation that previously fed many Australian animals. Populations of many native species were reduced drastically, disrupting the ecosystems there.
- Gypsy moths from Europe have overpopulated in parts of the U.S., eating nearly all the leaves of many trees, causing some of the trees to die, and leaving little food for other native species.
- Kudzu from Asia has grown over native plants in the southern U.S., blocking the light and crowding the roots of native plants, causing them to die.

LIVING ENVIRONMENT – *continued*

56 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Most flu viruses cause a runny nose and sore throat, while the H5N1 virus can cause pneumonia.
- The avian flu goes deeper into the lungs and can cause severe pneumonia.
- The avian flu has a more severe effect on humans than most other flu viruses.

57 [1] Allow 1 credit for antibodies.

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

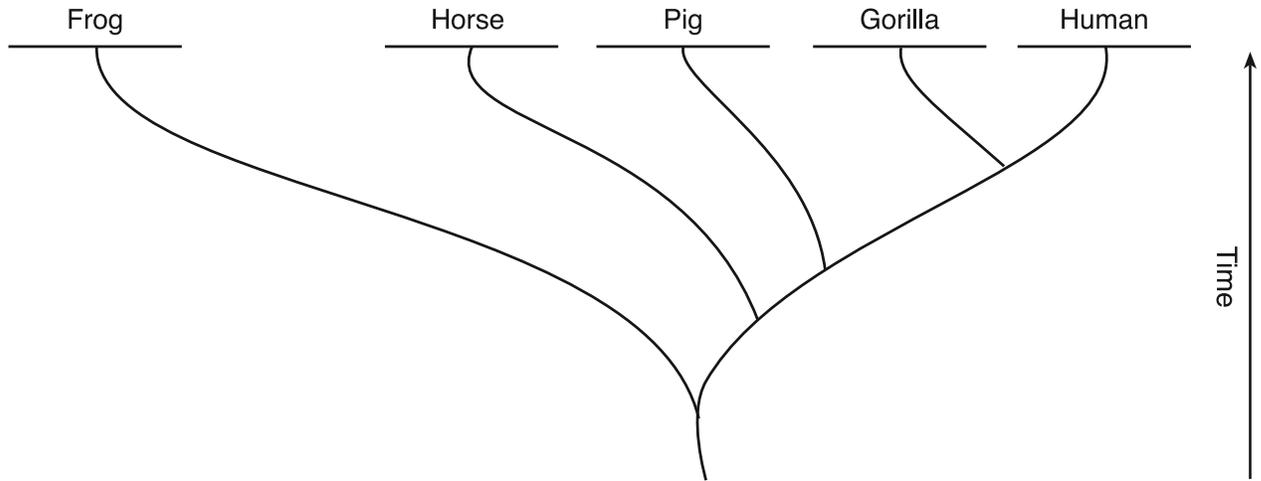
- A vaccine contains dead *or* weakened pathogens.

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

- mutation

Part D

60 [1] Allow 1 credit. All organisms must be in the correct positions as shown below.



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

- Chemical similarities are more reliable than structural similarities.
- Electrophoresis shows chemical similarities, which are more reliable.
- Many unrelated plants have a similar vein pattern.

62 2

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

- The pigment spot is below the surface of the solvent.
- The level of the solvent is too high.

64 1

65 [1] Allow 1 credit for 73.

Note: Allow credit for an acceptable response written in the data table if *no* response is written in the answer space.

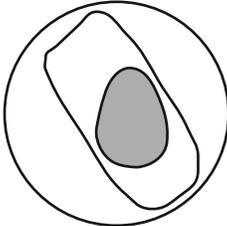
66 [1] Allow 1 credit for writing the name of *one* organ that is affected when a person runs a mile and for describing *one* change that occurs in this organ. Acceptable responses include, but are not limited to:

- Heart — beats faster
- Lungs — take in oxygen faster
- Muscles — use energy faster *or* use more ATP

67 2

68 [1] Allow 1 credit for a sketch showing that the cell membrane shrinks.

Example of a 1-credit response:



Note: Allow credit if the cell is drawn correctly but *not* shaded.

69 4

70 3

71 3

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

- Large ground finches eat mainly plant food and large tree finches eat mainly animal food.
- They do not compete for the same resources, so both can survive.
- They occupy different niches.

The *Chart for Determining the Final Examination Score for the June 2009 Regents Examination in Living Environment* will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Thursday, June 18, 2009. 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 2009 Living Environment

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

Part D 60–72	
Lab 1	60, 61, 63, 70
Lab 2	64, 65, 66
Lab 3	71, 72
Lab 5	62, 67, 68, 69

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Office of State Assessment
Albany, New York 12234

IMPORTANT NOTICE

**Regents Examination in
Living Environment**

Thursday, June 18, 2009

This notice pertains to the scoring of Question 50 of the Regents Examination in Living Environment.

Please make the corrections underlined below to lines 2. a. and 3. b. for the example of a 2-credit response for Question 50 on page 5 of the Scoring Key and Rating Guide:

2. a. **Four legs**.....**IV** (**Dog**)
3. b. **Fins not present or segments present**..... **I** (**Earthworm**)

Please photocopy this notice and give a copy of it to each teacher scoring this examination.

We apologize for any inconvenience this may cause you, and we thank you for your hard work on behalf of the students in New York State.



Regents Examination in Living Environment June 2009

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

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 to ensure the accuracy of the score. 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.