The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Tuesday, June 21, 2011 — 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.

A separate answer sheet for multiple-choice questions in Parts A, B–1, B–2, and D has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet.

You are to answer all questions in all parts of this examination. Record your answers for all multiple-choice questions, including those in Part B–2 and D, on the separate answer sheet. Record your answers for all open-ended questions directly in this examination booklet. All answers in this examination booklet 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 or in this examination booklet as directed.

When you have completed the examination, you must sign the declaration 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, record 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 phrase is an example of autotrophic nutrition?

(1) a cow eating grass in a field
(2) a mushroom digesting a dead log
(3) an apple tree making its own food
(4) a tapeworm feeding in the body of a dog

2 The ability of estrogen to affect certain cells depends directly on

(1) amino acids
(2) receptor molecules
(3) gametes
(4) nerve cells

3 By studying the chemicals in rare plants that grow only in rain forests, scientists hope to discover new life-saving medicines. Chances of finding such new medicines are reduced by

(1) predation by carnivores
(2) homeostasis in organisms
(3) recycling of materials in food webs
(4) loss of species due to human activities

4 When a species includes organisms with a wide variety of traits, it is most likely that this species will have

(1) a high proportion of individuals immune to genetic diseases
(2) a greater chance to survive if environmental conditions suddenly change
(3) less success competing for resources
(4) limitless supplies of important resources, such as food and water

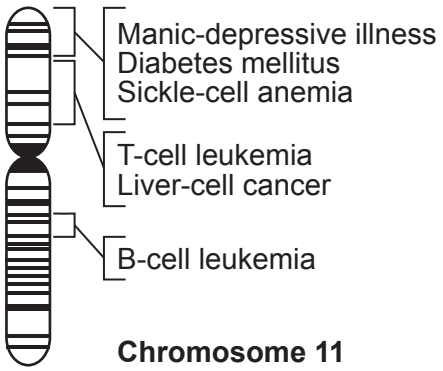
5 Some diseases and their causes are listed below.

A. Flu—influenza virus
B. Lung cancer—smoking
C. Cystic fibrosis—genes
D. Dysentery—parasitic ameba

Which disease would individuals have the greatest difficulty preventing in themselves?

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

6 The diagram below represents the banding pattern for human chromosome 11, with some of the bands labeled.



The bands represent

(1) proteins
(2) genes
(3) starches
(4) enzymes

7 A liver cell can make enzymes that a heart cell can *not* make because liver cells

(1) digest large, complex molecules
(2) contain more DNA than heart cells
(3) use different genes than the heart cells use
(4) remove carbon dioxide from blood

8 As male children get older, some begin to closely resemble their fathers and have no resemblance to their mothers. Which statement best explains this observation?

(1) Several sperm fertilized the egg, so the fertilized egg contained more genes from their father.
(2) More genes are inherited from the sperm cell of their father than from the egg cell of their mother, so most traits will be like those of their father.
(3) More genes from their father are expressed in traits that can be seen, and more genes from their mother are expressed in traits that cannot be seen, such as blood type or enzyme function.
(4) Genes from their father are stronger than genes from their mother, so the genes from their mother are not expressed.

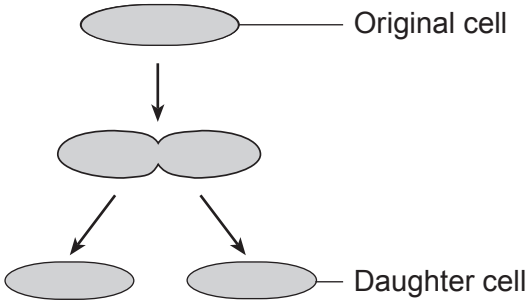
9 Which row in the chart below contains a cell structure paired with its primary function?

Row	Cell Structure	Function
(1)	ribosome	protein synthesis
(2)	vacuole	production of genetic information
(3)	nucleus	carbohydrate synthesis
(4)	mitochondrion	waste disposal

10 Which sequence represents the levels of biological organization from smallest to largest?

(1) organism → cell → tissue → organelle → organ system → organ
(2) organ system → organ → organism → cell → tissue → organelle
(3) organelle → organ system → cell → organism → tissue → organ
(4) organelle → cell → tissue → organ → organ system → organism

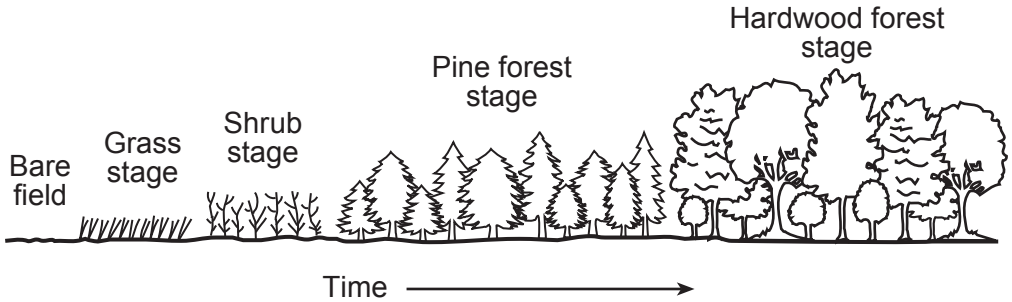
11 The diagram below represents division of a cell that produces two daughter cells.



Which statement most likely describes the daughter cells produced?

(1) The daughter cells will pass on only half of the genetic information they received from the original cell.
(2) The daughter cells will each produce offspring that will have the same genetic information as the original cell.
(3) The daughter cells will each undergo the same mutations as the original cell after reproduction has occurred.
(4) The daughter cells will not pass on any of the genes that they received from the original cell.

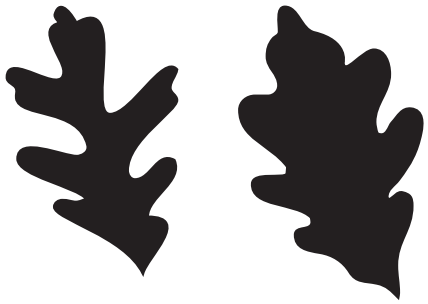
12 Which concept is best represented in the diagram below?



(1) random mutations
(2) ecological succession
(3) genetic engineering
(4) direct harvesting

13 The cells that make up leaves on a tree are genetically identical, yet the leaves often have different shapes and sizes, as shown in the diagram below.

Leaves of White Oak *(Quercus alba)*



Top leaves Bottom leaves

Which statement best explains this difference in leaf appearance?

(1) The leaves at the top of the tree get more sunlight, causing the genes in their cells to be expressed differently.
(2) The genes in the cells of leaves at the top of the tree are destroyed by sunlight, causing the leaves to stop growing.
(3) The leaves near the bottom of the tree have more genes related to leaf size, causing them to grow larger.
(4) The genes in the cells of leaves near the bottom of the tree increase in number, causing them to grow even larger.

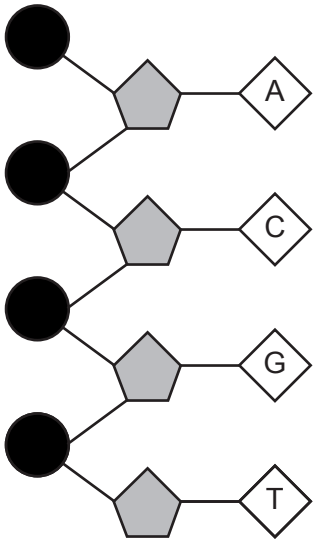
14 Selective breeding is a technique that is used to

(1) give all organisms a chance to reproduce
(2) produce organisms from extinct species
(3) produce offspring with certain desirable traits
(4) keep farm crops free of all mutations

15 On hot, dry days, guard cells often close microscopic openings in plant leaves, conserving water. This is an example of

(1) environmental factors causing gene mutation in plants
(2) finite resources acting as selecting agents for evolution
(3) a feedback mechanism for maintaining homeostasis
(4) differentiation in plants as a result of stimuli

16 The diagram below represents a portion of a DNA molecule.



The letters represent different types of

(1) sugar molecules (3) enzymes
(2) molecular bases (4) proteins

17 Cotton plants produce seeds that contain high-quality protein. This protein could be used as a food source except that the seeds are poisonous to humans. Recently, scientists have inserted a section of DNA into the cotton plants that makes the cotton seeds nonpoisonous. The technique for this procedure is known as

(1) gene manipulation (3) reproduction
(2) cloning (4) direct harvesting

18 Which mutation in a fruit fly could be passed on to its offspring?

(1) a mutation in a cell of an eye that changes the color of the eye
(2) a mutation in a leg cell that causes the leg to be shorter
(3) a mutation in a sperm cell that changes the shape of the wing
(4) a mutation in a cell of the digestive tract that produces a different enzyme

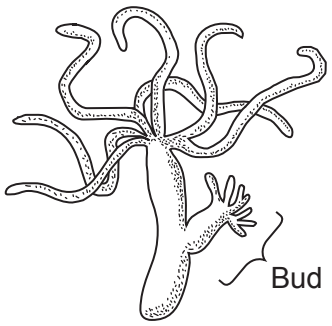
19 Which process initially provides the link between an abiotic factor and the energy needs of an entire ecosystem?

(1) respiration (3) decomposition
(2) photosynthesis (4) predation

20 Buffalo grass is a species of plant found on the grazing prairies of Wyoming. It is a tough grass that has silicates (compounds containing oxygen and silicon) that reinforce its leaves. For hundreds of years, this grass has survived in an adverse environment. Which statement best explains the presence of this grass today?

(1) There are no variations in this grass species that help it to survive in an adverse environment.
(2) Silicates are necessary for photosynthesis.
(3) The current species has no mutations.
(4) The silicates in the grass have given the species an advantage in its environment.

21 The bud shown in the diagram below was produced by asexual reproduction.



Which process is responsible for the formation of the bud?

(1) fertilization
(2) recombination
(3) mitosis
(4) meiosis

22 The temporary storage of energy in ATP molecules is part of which process?

(1) cell division
(2) cellular respiration
(3) protein synthesis
(4) DNA replication

23 A function of white blood cells is to

(1) transport oxygen to body cells
(2) produce hormones that regulate cell communication
(3) carry glucose to body cells
(4) protect the body against pathogens

24 Competition for biotic resources can be illustrated by organisms fighting for a limited amount of

(1) air to breathe
(2) water to drink
(3) mates for breeding
(4) space for nesting

25 Many biological catalysts, hormones, and receptor molecules are similar in that, in order to function properly, they must

(1) interact with each other at a high pH
(2) interact with molecules that can alter their specific bonding patterns
(3) contain amino acid chains that fold into a specific shape
(4) contain identical DNA base sequences

26 If only one type of tree is planted in an abandoned field, the ecosystem will

(1) evolve quickly and become extinct
(2) be unable to reach dynamic equilibrium
(3) contain little genetic variability
(4) be unable to cycle materials

27 Which organisms directly help to reduce overpopulation in a deer herd?

(1) parasites and predators
(2) parasites and scavengers
(3) decomposers and predators
(4) decomposers and consumers

28 In the human body, oxygen is absorbed by the lungs and nutrients are absorbed by the small intestine. In a single-celled organism, this absorption directly involves the

(1) nucleus
(2) chloroplasts
(3) cell membrane
(4) chromosomes

29 An earthworm lives and reproduces in the soil. It aerates the soil and adds organic material to it. The earthworm is a source of food for other organisms. All of these statements together best describe

(1) a habitat
(2) autotrophic nutrition
(3) an ecological niche
(4) competition

30 Depletion of nonrenewable resources is often a result of

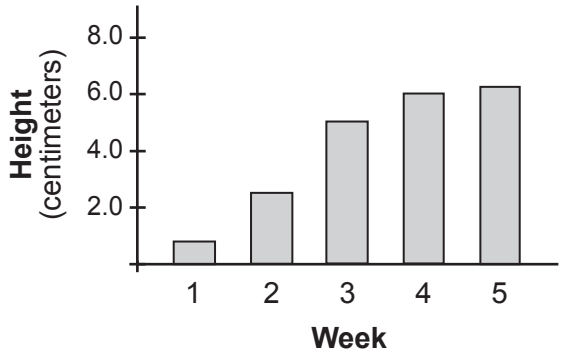
(1) environmental laws
(2) human population growth
(3) reforestation
(4) recycling

Part B–1

Answer all questions in this part. [13]

Directions (31–43): For *each* statement or question, record on the separate answer sheet the *number* of the word or expression that, of those given, best completes the statement or answers the question.

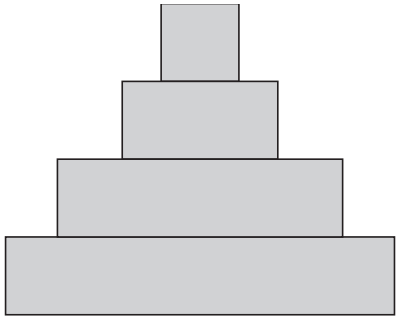
31 The bar graph below shows the height of a plant at the end of each week of a five-week growth period.



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

(1) The plant was given water during the first three weeks, only.
(2) The plant will grow faster during the sixth week than it did during the fifth week.
(3) The plant grew fastest during the first three weeks, and then it grew slower.
(4) The plant grew slowest during the first three weeks, and then it grew faster.

32 A diagram frequently used in ecological studies is shown below.



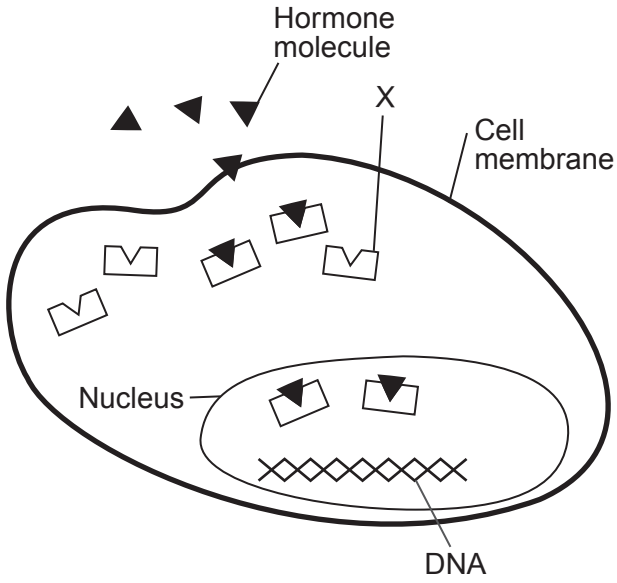
This diagram can be used to represent the

(1) dependency of animal survival on physical conditions in an ecosystem
(2) loss of energy from various groups of organisms in an ecosystem
(3) competition among species in an ecosystem
(4) mechanisms that maintain homeostasis in the plants in an ecosystem

33 A biologist formulates a hypothesis, performs experiments to test his hypothesis, makes careful observations, and keeps accurate records of his findings. In order to complete this process, the biologist should

(1) adjust the data to support the hypothesis
(2) eliminate data that do not support the hypothesis
(3) write a research paper explaining his theories before performing his experiments, in order to gain funding sources
(4) evaluate the findings and, if necessary, alter the hypothesis based on his findings, and test the new hypothesis

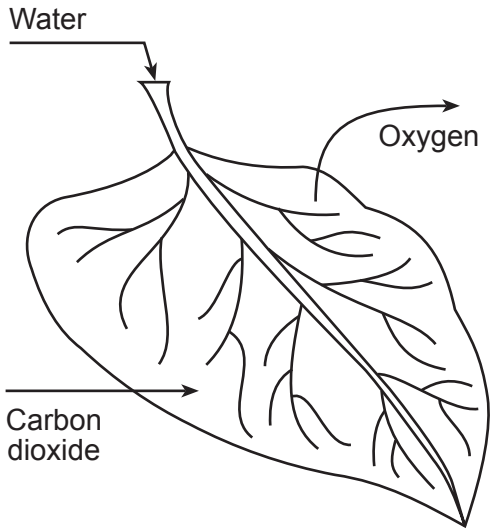
Base your answer to question 34 on the diagram below and on your knowledge of biology.



34 Structure *X* most likely functions in the

(1) transport of chemical messenger molecules into the cell nucleus
(2) extraction of energy from nutrients
(3) separation of cell contents from the outside environment
(4) digestion of large molecules

35 The arrows in the diagram below represent the movement of materials.



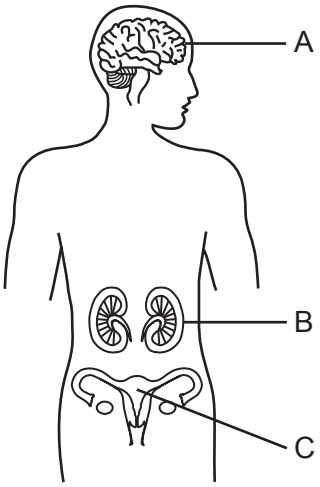
This movement of materials indicated by the arrows is most directly involved in the processes of

(1) respiration and replication
(2) photosynthesis and excretion
(3) digestion and recycling
(4) circulation and coordination

36 When using a compound light microscope, the most common reason for staining a specimen being observed is to

(1) keep the organism from moving around
(2) make the view more colorful
(3) determine the effects of chemicals on the organism
(4) reveal details that are otherwise not easily seen

Base your answers to questions 37 through 39 on the diagram below and on your knowledge of biology.



37 Failure of structure *A* to function properly would most directly disrupt

(1) autotrophic nutrition
(2) chromosome replication
(3) cellular communication
(4) biological evolution

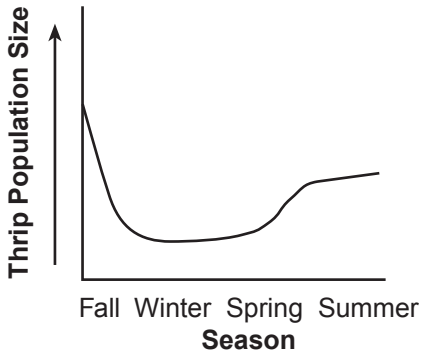
38 Structure *B* represents

(1) cells, only
(2) cells and tissues, only
(3) an organ with cells and tissues
(4) a complete system with organs, tissues, and cells

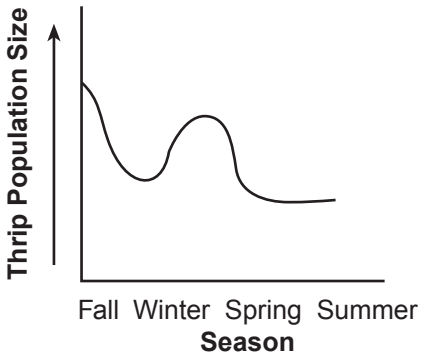
39 Structure *C* is part of which body system?

(1) digestive
(2) reproductive
(3) circulatory
(4) nervous

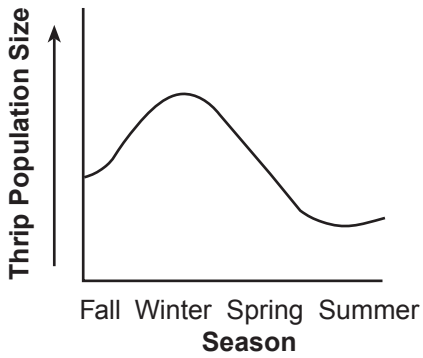
40 Thrips are insects that feed on the pollen and flowers of certain plants. The size of a thrip population depends on the number of flowers available. Which graph best represents changes in a population of thrips if winter was longer than usual and the summer was too cool and dry for many flowers to bloom?



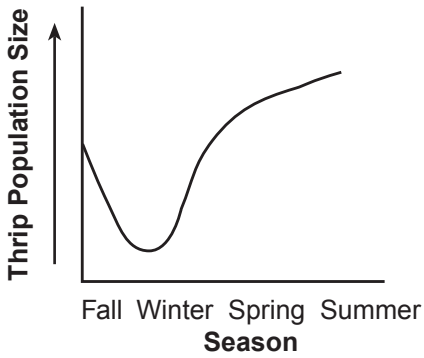
(1)



(3)

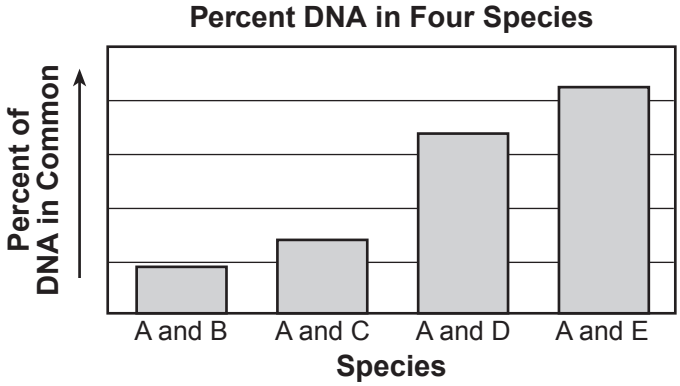


(2)



(4)

41 The percent of DNA that species *A* has in common with species *B*, *C*, *D*, and *E* are shown in the graph below.



Which statement is a valid conclusion that can be drawn from this graph?

(1) Species *A* is closely related to species *B*, but is not related to species *E*.
(2) Fewer mutations have occurred in species *B* and *C* than in species *A*.
(3) Species *A* and *E* have the greatest similarity in protein structure.
(4) Environment influences the rate of evolution.

Base your answers to questions 42 and 43 on the passage below and on your knowledge of biology.

> …Corals come in about 1,500 known species—from soft swaying fans to stony varieties with hard skeletons that form reef bases. They are made up of polyps, tiny animals that live in colonies and feed at night on microscopic plants and creatures. The coral's surface is the living part, with color infused by single-celled algae called zooxanthellae that live in polyp tissue. The algae act like solar panels, passing energy to the coral as they photosynthesize while feeding on the coral's waste.
>
> Extremely sensitive, corals survive in a narrow range of temperature, sunlight and salinity. An uncommonly severe El Niño in 1998 raised ocean temperatures and changed currents, causing bleaching that devastated reefs worldwide. Scientists say parts of the Indian Ocean lost up to 90 percent of corals. The bleaching struck reefs around the Persian Gulf, East Africa, Southeast Asia and the Caribbean. Some recovered. Many died. …
>
> Source: Associated Press, December 2001

42 The relationship between the polyps and the zooxanthellae can best be described as

(1) negative for both
(2) neutral for both
(3) positive for both
(4) negative for one and positive for the other

43 The passage contains information concerning

(1) limiting factors
(2) reproductive methods
(3) bacteria
(4) competition

Part B–2

Answer all questions in this part. [12]

Directions (44–55): For those questions that are multiple choice, record on your separate answer sheet the *number* of the choice that, of those given, best completes each statement or answers each question. For all other questions in this part, follow the directions given and record your answers in the spaces provided.

44 State *one* way insect pests in an apple orchard can be controlled without using chemical pesticides. [1]

_____

_____

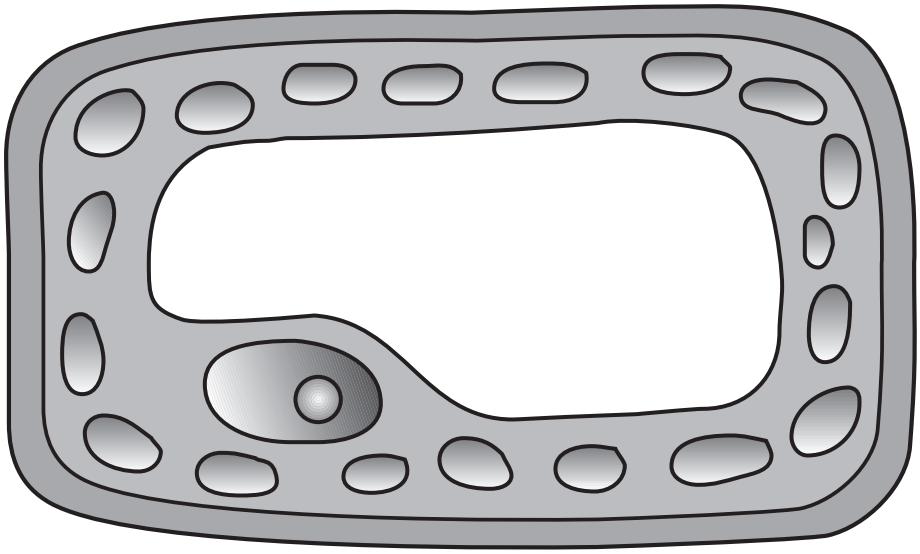
45 The tranquilizer thalidomide was once prescribed for pregnant women. When this drug was used between the third and sixth week after fertilization, serious deformities in the fetus occurred as the fetus developed. State why thalidomide would have a greater effect on development when used between weeks 3 and 6 than when used in late pregnancy. [1]

_____

_____

_____

46 Draw an arrow to indicate *one* part of the plant cell below that would *not* be found in an animal cell. The tip of the arrow must touch the part being identified. [1]



Base your answers to questions 47 and 48 on the information and chart below and on your knowledge of biology.

Body weight is considered to be a risk factor for diseases such as diabetes and high blood pressure. The Body Mass Index (BMI) chart can be used as a guide to determine if a person's body weight puts them at risk for such diseases. A portion of this chart is shown below.

Calculating Your Body Mass Index (BMI)

	Healthy		Overweight					Obese			
BMI	**19**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**35**	**40**	**45**
Height	**Weight in Pounds**										
5'4"	110	140	145	151	157	163	169	174	204	232	262
5'5"	114	144	150	156	162	168	174	180	210	240	270
5'6"	118	148	155	161	167	173	179	186	216	247	278
5'7"	121	153	159	166	172	178	185	191	223	255	287
5'8"	125	158	164	171	177	184	190	197	230	262	295
5'9"	128	162	169	176	182	189	196	203	236	270	304
5'10"	132	167	174	181	188	195	202	209	243	278	313
5'11"	136	172	179	186	193	200	208	215	250	286	322

Note: The answer to question 47 should be recorded on your separate answer sheet.

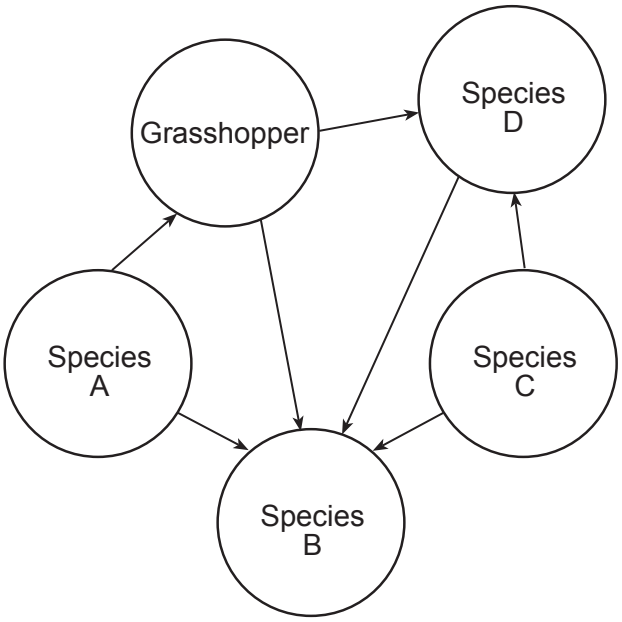
47 The BMI for a person who is 5 feet 9 inches tall and weighs 170 pounds is between

(1) 24 and 25
(2) 25 and 26
(3) 27 and 28
(4) 29 and 30

48 Is the person described in question 47 at risk for diseases such as diabetes or high blood pressure? Support your answer. [1]

Note: The answer to question 49 should be recorded on your separate answer sheet.

49 The diagram below represents a food web.



Which species would most likely be a decomposer?

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

Base your answers to questions 50 and 51 on the passage below and on your knowledge of biology.

Plants of the snow lotus species, *Saussurea laniceps*, are used in Tibet and China to produce traditional medicines. These plants bloom just once, at the end of a seven-year life span. Collectors remove the taller blooming plants, which they consider to have the best medicinal value. Some scientists are concerned that the continual selection and removal of the tall plants from natural ecosystems may result in a change in the average height of the snow lotus in future populations.

Note: The answer to question 50 should be recorded on your separate answer sheet.

50 The removal of the taller plants is an example of

(1) genetic engineering
(2) direct harvesting
(3) selective breeding
(4) asexual reproduction

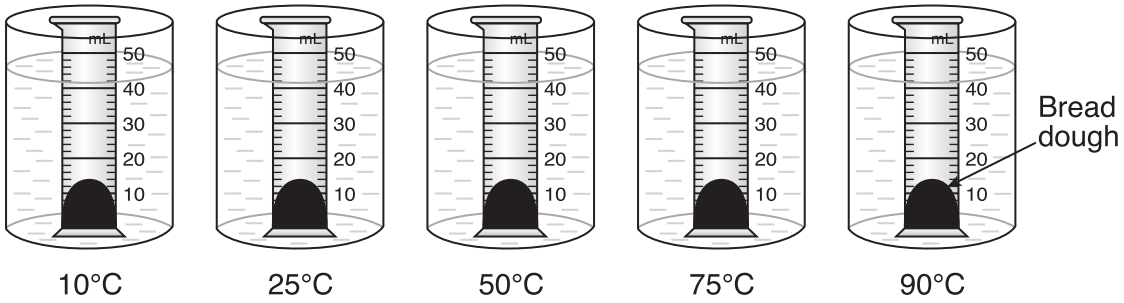
51 State *one* way that the removal of the taller snow lotus plants from ecosystems interferes with the process of natural selection. [1]

Base your answers to questions 52 through 55 on the information below and on your knowledge of biology.

A biology class conducted an experiment to determine the rate of respiration of yeast in bread dough at various temperatures.

Bread dough will rise due to the production of carbon dioxide by the yeast present in the dough.

An equal amount of dough was placed in the bottom of each of five graduated cylinders. Each cylinder was then placed in a different water bath to maintain a particular temperature. A diagram of the setup is shown below.



The amount of expansion of the dough in each cylinder was measured after 15 minutes. The results are shown in the data table below.

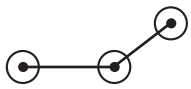
The Effect of Temperature on Yeast Respiration

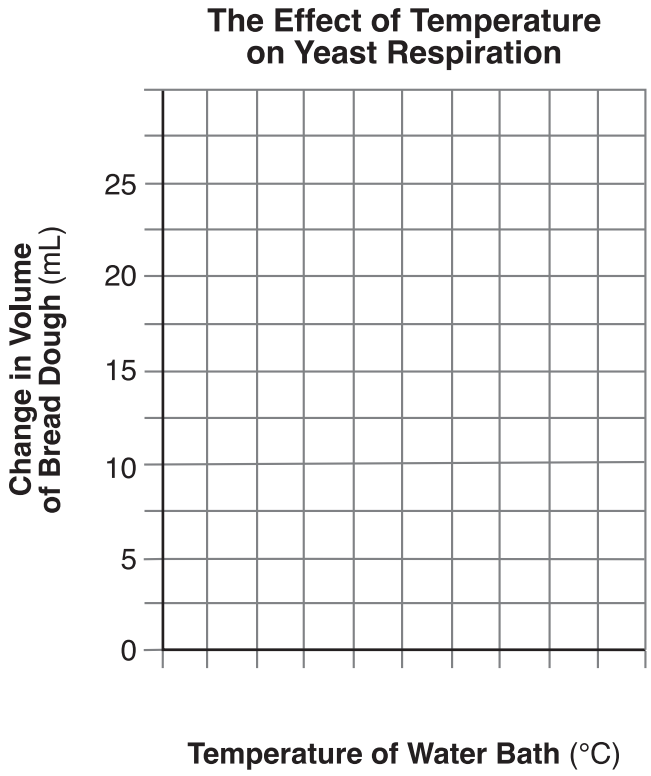
Temperature of Water Bath (°C)	**Change in Volume of Bread Dough** (mL)
10	4
25	11
50	20
75	25
90	2

Directions (52–53): Using the information in the data table, construct a line graph on the grid, following the directions below.

52 Mark an appropriate scale, without any breaks, on the axis labeled "Temperature of Water Bath (°C)." [1]

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

Example: 



54 At which temperature did yeast cells produce the *least* amount of gas in 15 minutes? [1]

_____**°C**

55 Identify the independent variable in this investigation. [1]

_____

_____

Part C

Answer all questions in this part. [17]

Directions (56–72): Record your answers in the spaces provided in this examination booklet.

Base your answer to question 56–59 on the information below and on your knowledge of biology.

Many people have a sensitivity to peanuts. The symptoms can include watery, itchy eyes and difficulty breathing. This allergic reaction can be mild, severe, or fatal.

56–59 Discuss why an individual can have a sensitivity to peanuts. In your answer, be sure to:

- identify the human system that is responsible for this sensitivity to peanuts [1]
- identify the specific type of molecule that triggers an allergic reaction [1]
- state *one* reason why a person could be allergic to peanuts, but *not* be allergic to walnuts [1]
- describe how this reaction is similar to the rejection of a transplanted organ [1]

60 State *one* way the decision of high school students to drive to school rather than ride a bus to school can have a *negative* environmental impact on future generations. [1]

Base your answers to questions 61 through 64 on the passage below and on your knowledge of biology.

Dandelions are weeds that are very common in many grassy areas of New York State. Dandelion flowers first open up in a bright-yellow stage, and later turn a fluffy white when they are ready to release their seeds. The seeds are carried by the wind, and can sometimes travel great distances before landing and growing into new plants. The stems of dandelions are usually very long, typically about 20–30 centimeters (cm), and stand high above the surrounding grass.

A science teacher in Niagara County discovered an area in her lawn where nearly every dandelion had a stem less than 1 cm long. These short dandelions were replacing large amounts of grass in the lawn surrounding her house. They were growing much more thickly than the taller dandelions in other nearby areas. The short dandelions appeared to be growing very successfully in one area of her lawn, but did not appear to have spread to other areas of her lawn. The science teacher noticed that every time she mowed her lawn, the short dandelions were left untouched by the mower blades, and that their numbers were steadily increasing.

61 State *one* possible cause of the genetic variation in dandelion height. [1]

_____

62 State *one* possible explanation for the fact that the short dandelions had not yet spread to other areas of her lawn. [1]

_____

_____

63 State *one* possible reason why the amount of grass was decreasing, while the number of short dandelions was increasing in the lawn of the science teacher. [1]

_____

_____

64 State *one* possible advantage the short dandelions may have over the tall dandelions in this yard. [1]

_____

_____

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

The New York State Department of Health issues health advisories on eating specific fish. Some of these fish contain toxic chemicals that were passed through the food chain and accumulate in the tissues of these fish. The advisories include general advice on fish caught in specific bodies of water. The advisory tells people how to minimize their exposure to toxins in these fish in order to reduce health risks associated with them.

65 Different species of fish are found in different positions in a food chain, depending on what they eat. Explain how the position of a fish in a food chain would affect the amount of toxins present in the tissues of the fish. [1]

_____

_____

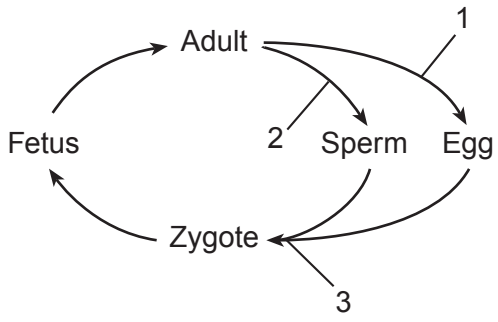
66 State *one* action that could be taken to reduce the amount of toxins present in the environment inhabited by these fish. [1]

_____

_____

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

The diagram below represents some stages in the life cycle of humans. The numbers in the diagram represent various processes in the cycle.



67 State how processes 1 and 2 affect the amount of genetic information provided by a parent to its offspring. [1]

_____

_____

68 State how process 3 affects the amount of genetic information an offspring receives. [1]

_____

_____

69 Suggest *one* way that doctors or patients can help to reduce the chances of bacteria becoming resistant to an antibiotic. [1]

_____

_____

Base your answers to questions 70 through 72 on the information below and on your knowledge of biology.

In the 1980s, global deforestation was estimated at 17 to 20 million hectares per year, an area the size of Great Britain. Today, the area affected by deforestation has decreased significantly in some regions of the world through the use of sustainable forest management. However, there are still regions of the world affected by wide-scale deforestation, because of the short-term economic benefits. The harmful effects of deforestation on regional and worldwide climate and ecology continue as forest areas are destroyed.

70 State *one* short-term economic benefit of deforestation. [1]

_____

_____

71 Explain how deforestation decreases biodiversity. [1]

_____

_____

72 Explain how wide-scale deforestation may contribute to global warming. [1]

_____

_____

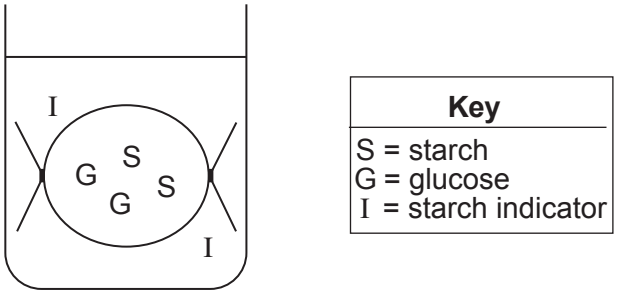
Part D

Answer all questions in this part. [13]

Directions (73–85): For those questions that are multiple choice, record on your separate answer sheet the *number* of the choice that best completes the statement or answers the question. For all other questions in this part, follow directions given in the question and record your answer in the spaces provided.

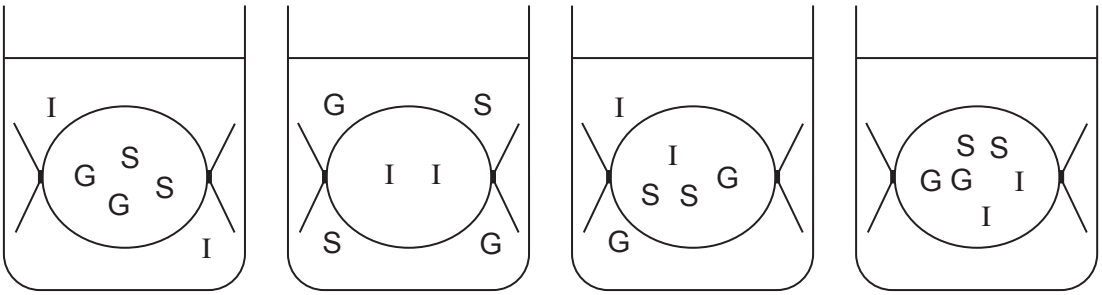
Note: The answer to question 73 should be recorded on your separate answer sheet.

73 A model cell setup is represented in the "Initial State" diagram below.



Initial state

Which diagram indicates the areas where each of these substances would be located after 20 minutes? [1]



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

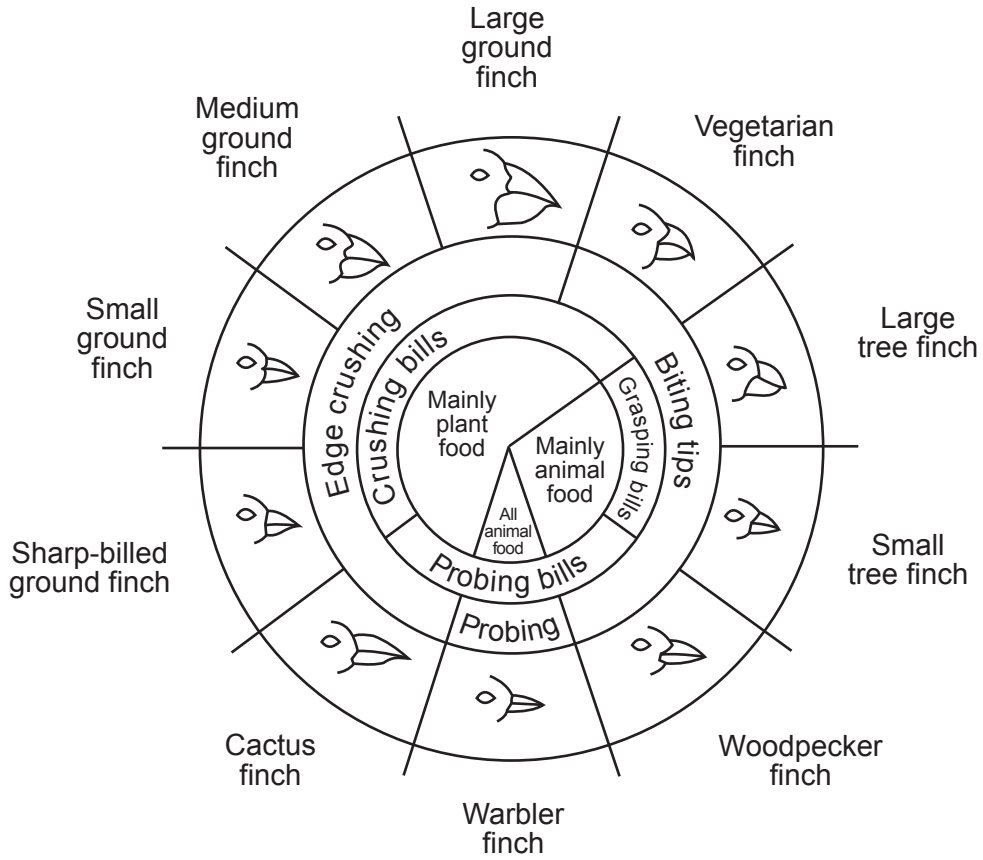
Note: The answer to question 74 should be recorded on your separate answer sheet.

74 Which factor most likely contributed to the evolution of Galapagos Islands finches with different beak shapes?

(1) similar climates on the different islands
(2) competition between the finches for food
(3) cloning experiments carried out by native people on the islands
(4) increased rate of asexual reproduction

Base your answer to question 75 on the finch diversity diagram below and on your knowledge of biology.

Variations in Beaks of Galapagos Islands Finches



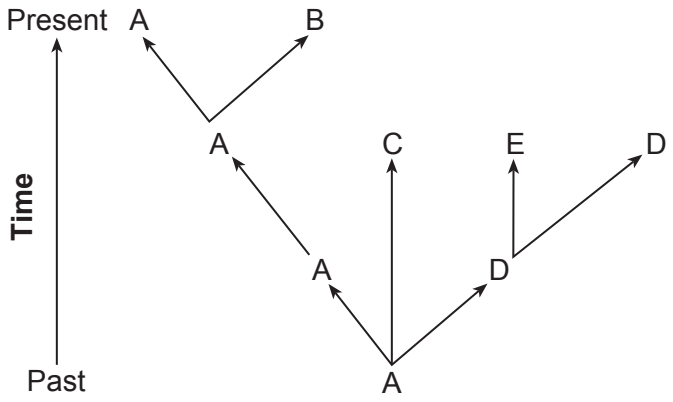
From: *Galapagos: A Natural History Guide*

Note: The answer to question 75 should be recorded on your separate answer sheet.

75 Warbler finches are classified as

(1) producers
(2) herbivores
(3) carnivores
(4) decomposers

Base your answers to questions 76 through 78 on the diagram below and on your knowledge of biology. Letters *A* through *E* represent different species of organisms. The arrows represent long periods of geologic time.



Note: The answer to question 76 should be recorded on your separate answer sheet.

76 Which species would most likely show the greatest similarities in their amino acid sequences?

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

77 Which species is the common ancestor to all of the other species? [1]

_____

78 Identify *one* species that was *not* able to adapt to its environment. Support your answer. [1]

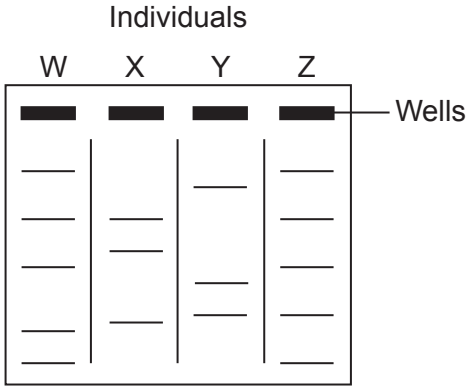
_____

_____

_____

Base your answers to questions 79 through 81 on the information and diagram below and on your knowledge of biology. The diagram represents some of the steps in a procedure used in a specific laboratory activity.

Samples of DNA from an eye-color gene of four individuals, *W*, *X*, *Y*, and *Z*, were cut into pieces using a type of chemical. The results of this procedure are shown below.



79 Identify the specific type of chemical used to cut the DNA in this procedure. [1]

_____

80 Which *two* individuals have DNA base patterns for this gene that are the most similar? Support your answer. [1]

Individuals: _____ and _____

_____

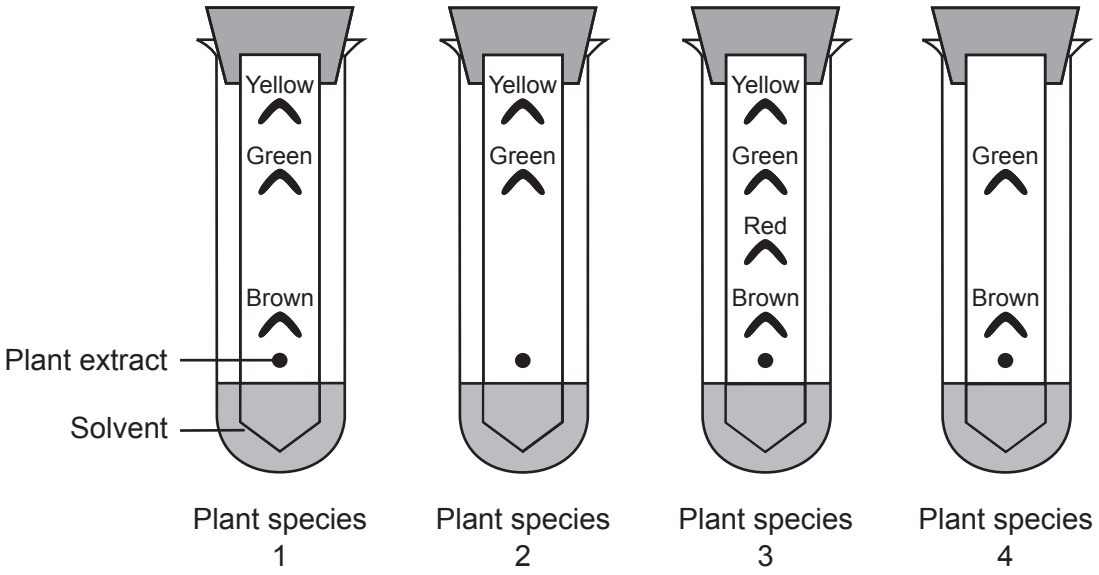
_____

Note: The answer to question 81 should be recorded on your separate answer sheet.

81 The diagram represents the results of the procedure known as

(1) cloning
(2) chromatography
(3) gel electrophoresis
(4) protein sequencing

Base your answer to question 82 on the results of an experiment using plant pigments represented below and on your knowledge of biology.



Note: The answer to question 82 should be recorded on your separate answer sheet.

82 Which phrase could be used to describe this technique?

(1) the use of chromatography to separate molecules in a mixture
(2) the use of cut leaves to observe certain colors
(3) using indicators to determine pH
(4) using dichotomous keys to identify plants

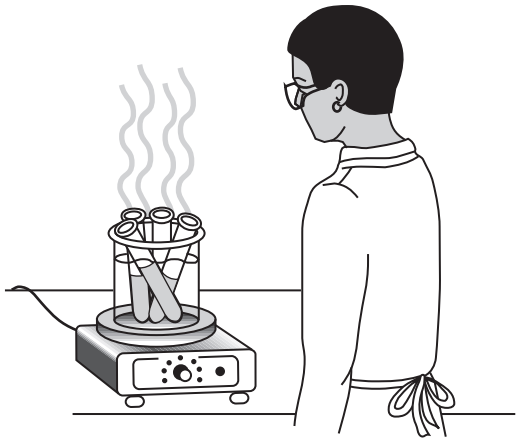
Base your answers to questions 83 and 84 on the information below and on your knowledge of biology.

A student checked her pulse rate three times during one day. When she first woke up, her pulse rate was 54 beats per minute (bpm). As she walked to her first-period class, it was 71 bpm. Later, she recorded 98 bpm after playing in a basketball game.

83 State *one* reason for the change in her pulse rate throughout the day. [1]

84 State *one* way a change in pulse rate helps to meet the needs of the body. [1]

85 The diagram below shows a student heating some test tubes with chemicals in them during a laboratory activity.



Explain why putting stoppers in the test tubes could be dangerous. [1]

_____

_____

_____

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LIVING ENVIRONMENT

FOR TEACHERS ONLY

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

LE

LIVING ENVIRONMENT

Tuesday, June 21, 2011 — 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 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 at: http://www.p12.nysed.gov/apda/ and select the link "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.

Multiple Choice for Parts A, B–1, B–2, and D
Allow 1 credit for each correct response.

Part A

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

Part B–1

31 ..... **3**	35 ..... **2**	39 ..... **2**	43 ..... **1** .....
32 ..... **2**	36 ..... **4**	40 ..... **1**	
33 ..... **4**	37 ..... **3**	41 ..... **3**	
34 ..... **1**	38 ..... **3**	42 ..... **3**	

Part B–2

47 ..... **2**	49 ..... **2**	50 ..... **2** .....

Part D

73 ..... **3**	75 ..... **3**	81 ..... **3** .....
74 ..... **2**	76 ..... **2**	82 ..... **1** .....

Directions to the Teacher

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.*

Do *not* attempt to *correct* the student's work by making insertions or changes of any kind.

Allow 1 credit for each correct response.

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 more than approximately one-half of 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. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

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.

For handscoring, raters should enter the scores earned in the appropriate boxes printed on the separate answer sheet. Next, the rater should add these scores and enter the total in the box labeled "Total Raw Score." Then the student's raw score should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: http://www.p12.nysed.gov/apda/ on Tuesday, June 21, 2011. The student's scale score should be entered in the box labeled "Scale Score" on the student's answer sheet. The scale score is the student's final examination score.

Beginning in June 2011, schools are no longer permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale 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

44 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— increase the number of natural predators of the insect pest

— use a biological control

— use flypaper/traps

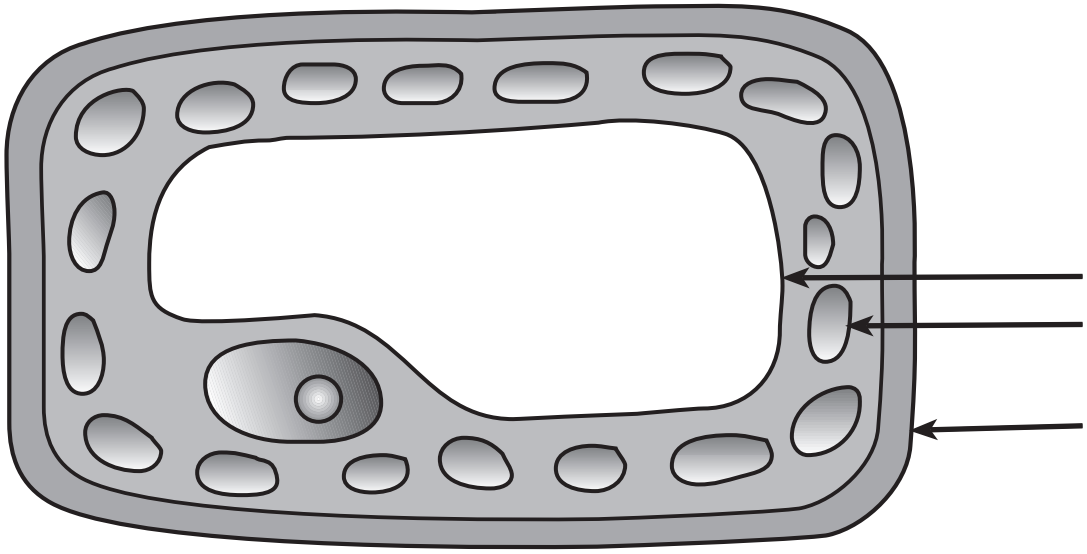
45 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Most organs begin to develop between weeks 3 and 6, whereas, in late pregnancy, these organs are fully formed.

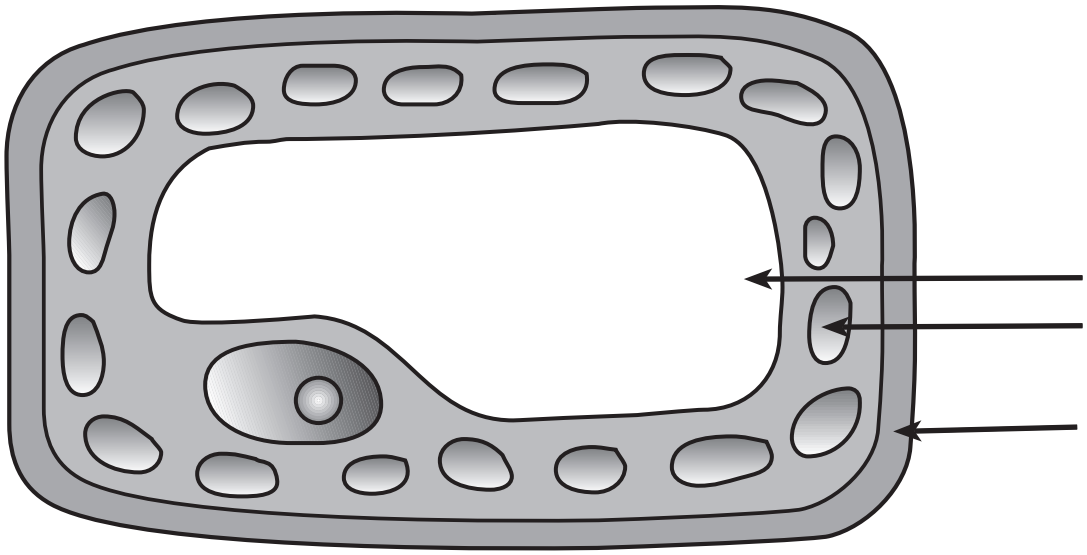
— In late pregnancy, major organs would already have been formed and less damage would have occurred.

46 [1] Allow 1 credit for an arrow indicating *one* of the three correct plant parts, shown below.

Examples of 1-credit responses for question 46:



or



Note: If more than one arrow is drawn, *all* arrows must be correct to receive credit.

47 **MC on Scoring Key**

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

— The BMI indicates the person is overweight and is therefore at risk for these diseases.

— There is a slight risk because the BMI places the person in the overweight range, but not in the obese range.

— yes, because the BMI is over 25

49 **MC on Scoring Key**

50 **MC on Scoring Key**

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

— It results in a smaller gene pool.

— It reduces the variety available for selection within populations.

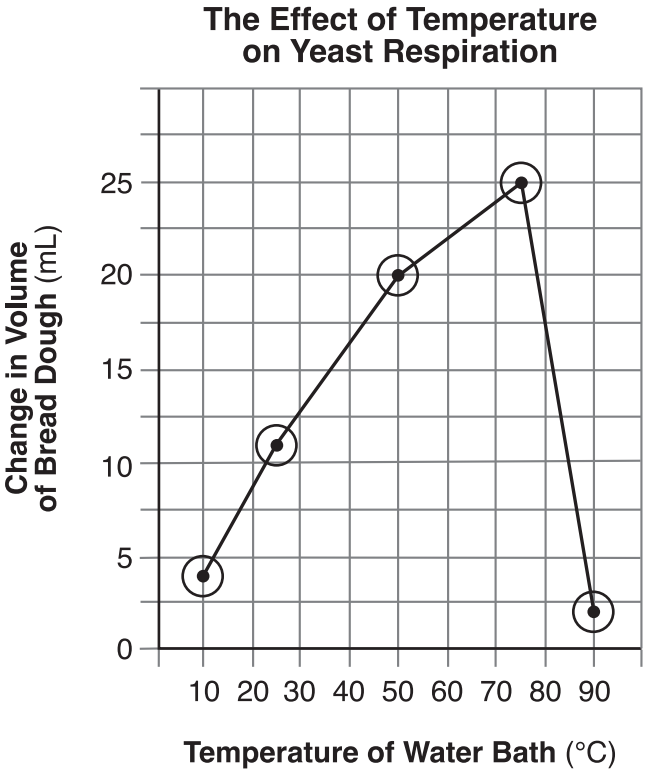
— Tall varieties would not have a chance to reproduce.

— removes genes for tallness from the population

52 [1] Allow 1 credit for marking an appropriate scale, without any breaks, on the "Temperature of Water Bath (°C)" axis.

53 [1] Allow 1 credit for correctly plotting the data and connecting the points.

Example of a 2-credit graph for questions 52 and 53:



Note: Allow credit if the points are plotted correctly but not circled.
Do *not* assume the intersection of the *x*-axis and *y*-axis is the origin (0,0) unless it is labeled. An appropriate scale only needs to include the data range in the data table. Do *not* allow credit for plotting points that are not in the data table, e.g., (0,0), or for extending lines beyond the data points.

54 [1] Allow 1 credit for 90°C or an answer consistent with the student's graph for questions 52 and 53.

55 [1] Allow 1 credit for temperature.

Part C

Note: The student's response to the bulleted items in question 56–59 need *not* appear in the following order.

56 [1] Allow 1 credit for identifying the human system that is responsible for this sensitivity to peanuts as the immune system.

Note: Do *not* accept circulatory system.

57 [1] Allow 1 credit for identifying the specific type of molecule that triggers an allergic reaction. Acceptable responses include, but are not limited to:

— antigen

— protein

— allergen

58 [1] Allow 1 credit for stating *one* reason why a person could be allergic to peanuts, but *not* be allergic to walnuts. Acceptable responses include, but are not limited to:

— One type of antibody only reacts with (fits) one type of antigen.

— Antibody reactions are specific.

— Walnuts and peanuts have different proteins.

— Walnuts and peanuts are made up of different chemicals.

59 [1] Allow 1 credit for describing how this reaction is similar to the rejection of a transplanted organ. Acceptable responses include, but are not limited to:

— Transplanted organs also have antigens that will stimulate antibodies that will attack the organ.

— They both stimulate immune responses.

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

— Global warming is impacted when more carbon dioxide is produced by many cars driven by the same number of students that could be transported by a few buses.

— The exhaust from additional cars may lead to air pollution that will affect the environment for years.

Note: The student's response must include a negative environmental impact. Stating "depleting fossil fuels" alone is *not* an acceptable answer.

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

— mutation

— changes in DNA

— recombination/recombining of genes

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

— The seeds from plants with shorter stems are less likely to be carried by the wind.

— The short dandelions do not have an adaptation needed for survival in other areas of the lawn.

— The seeds from the shorter dandelions did not land there.

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

— The dandelions out-compete the grass for the same limited resources.

— The dandelions are better adapted for survival.

— The dandelions shade the grass.

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

— Short dandelions are less likely to be cut down by a lawnmower.

— Short dandelions will be left to reproduce.

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

— Organisms higher up in the food chain have a high concentration of toxins because they eat more of the organisms lower in the food chain and build up the concentration in their tissue.

— Predators have a high concentration because they eat organisms that have already accumulated toxins.

66 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— pass laws to force individuals/companies to stop polluting

— reduce runoff of environmental hazards from farms, roadways, or parking lots

— remove the toxins from the environment

— develop nontoxic alternatives to these chemicals

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

— These processes reduce the amount of genetic information from each parent by half.

— Each parent only contributes half of the genetic information that is contained in his or her own cells.

— Each egg (or each sperm) will carry only half of the genetic information contained in the parent's body cells.

68 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— This process ensures that offspring will have all the genetic information needed.

— Fertilization restores the full number of chromosomes characteristic of the species.

— When the sperm and egg combine, the zygote will contain a full set of chromosomes.

69 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Doctors should prescribe antibiotics only for bacterial infections.

— Patients should not use antibiotics without the advice of a doctor.

— Patients should use the antibiotic for the prescribed number of days, and not stop taking it when they feel better.

— Do not use antibiotics for viral infections.

70 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— obtain more farmland

— more lumber available for sale

— decrease the cost of lumber

— space to build larger communities

— increased profit

— more jobs available

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

— organisms lose habitats

— many different species are removed

— some species may become extinct

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

— With fewer plants to absorb carbon dioxide, the carbon dioxide remains in the atmosphere, contributing to the greenhouse effect that causes global warming.

— If the trees are burned, carbon dioxide will be added to the atmosphere.

Part D

73 **MC on Scoring Key**

74 **MC on Scoring Key**

75 **MC on Scoring Key**

76 **MC on Scoring Key**

77 [1] Allow 1 credit for *A*.

78 [1] Allow 1 credit for species *C or D or E* and for supporting the answer. Acceptable responses include, but are not limited to:

— Species *C*, because it became extinct.

— *D*, because it is no longer alive.

— Species *E* does not continue to the present.

79 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— enzymes

— restriction enzymes

— biological catalyst

80 [1] Allow 1 credit for *W* and *Z* and for supporting the answer.

— because 4 of the 5 bands are identical

— They have the greatest number of matching bands.

81 **MC on Scoring Key**

82 **MC on Scoring Key**

83 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— When the student was sleeping, her activity was minimal and her pulse rate was slow. When she was walking, she used more energy, resulting in an increased pulse rate.

— Pulse rate varies with activity level.

— Her body was maintaining homeostasis.

— Her heart beats faster when she is more active.

84 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Increased pulse rate increases the availability of food and oxygen to cells.

— The pulse rate is an indication of the activity level of the body. Additional food and oxygen is provided to body cells with an increase in pulse rate.

— increases the removal of wastes from cells

85 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The stoppers would pop out of the heated tubes and possibly injure someone.

— The test tubes may explode.

The *Chart for Determining the Final Examination Score for the June 2011 Regents Examination in Living Environment* will be posted on the Department's web site at: http://www.p12.nysed.gov/apda/ on Tuesday, June 21, 2011. 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 Submition 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 http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm.
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 2011 Living Environment

Standards	Question Numbers			
	Part A 1–30	Part B–1 31–43	Part B–2 44–55	Part C 56–72
Standard 1 — Analysis, Inquiry and Design				
Key Idea 1			54	
Key Idea 2				
Key Idea 3		31, 33	47, 48, 52, 53	
Appendix A (Laboratory Checklist)		36	55	
Standard 4				
Key Idea 1	2, 9, 10, 28	34, 37, 38, 39, 40	46, 49	
Key Idea 2	6, 7, 11, 13, 14, 16, 17	41		
Key Idea 3	4, 18, 20		51	61, 62, 63, 64, 69
Key Idea 4	8, 21		45	67, 68
Key Idea 5	5, 15, 19, 22, 23, 25	35		56, 57, 58, 59
Key Idea 6	1, 3, 12, 24, 27, 29	32, 42, 43		65
Key Idea 7	26, 30		44, 50	60, 66, 70, 71, 72

Part D 73–85	
Lab 1	76, 77, 78, 79, 80, 81, 82
Lab 2	83, 84
Lab 3	74, 75
Lab 5	73, 85

The State Education Department / The University of the State of New York

Regents Examination in Living Environment – June 2011

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

Raw Score	Scale Score
85	100
84	98
83	97
82	97
81	96
80	95
79	94
78	94
77	93
76	92
75	91
74	91
73	90
72	89
71	88
70	88
69	87
68	86
67	86
66	85
65	84
64	83
63	83
62	82
61	81
60	81
59	80
58	79
57	79

Raw Score	Scale Score
56	78
55	77
54	76
53	76
52	75
51	74
50	73
49	73
48	72
47	71
46	70
45	69
44	68
43	67
42	66
41	66
40	65
39	64
38	62
37	61
36	60
35	59
34	58
33	57
32	56
31	54
30	53
29	52
28	51

Raw Score	Scale Score
27	49
26	48
25	46
24	45
23	44
22	42
21	41
20	39
19	37
18	36
17	34
16	33
15	31
14	29
13	27
12	25
11	24
10	22
9	20
8	18
7	16
6	14
5	11
4	9
3	7
2	5
1	2
0	0

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.

Beginning in June 2011, schools are no longer permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart change from one administration 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 Regents Examination in Living Environment.