The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Wednesday, August 18, 2010 — 12:30 to 3:30 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.

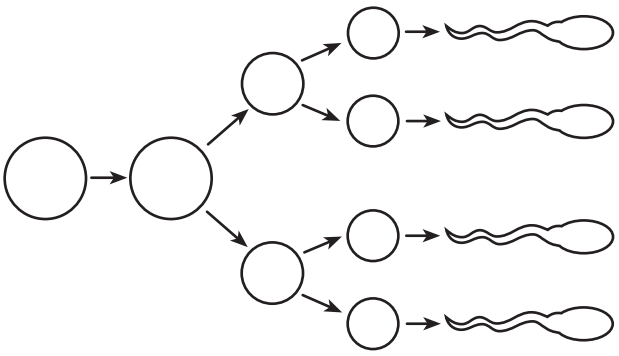
1 An ecosystem that has almost the same number and type of organisms for many years is exhibiting

(1) feedback
(2) global instability
(3) environmental change
(4) equilibrium

2 Which system is correctly paired with its function?

(1) immune system—intake and distribution of oxygen to cells of the body
(2) excretory system—remove potentially dangerous materials from the body
(3) digestive system—transport energy-rich molecules to cells
(4) circulatory system—produce building blocks of complex compounds

3 Which statement concerning the reproductive cells in the diagram below is correct?



(1) The cells are produced by mitosis and contain all the genetic information of the father.
(2) If one of these cells fertilizes an egg, the offspring will be identical to the father.
(3) Each of these cells contains only half the genetic information necessary for the formation of an offspring.
(4) An egg fertilized by one of these cells will develop into a female with the same characteristics as the mother.

4 Which set of functions is directly controlled by the cell membrane?

(1) protein synthesis, respiration, digestion of food molecules
(2) active transport, recognition of chemical messages, protection
(3) enzyme production, elimination of large molecules, duplication of DNA codes
(4) release of ATP molecules, regulation of cell reproduction, food production

5 When a new viral infection appears in a population, scientists usually try to develop a vaccine against the virus. Which substances would most likely be contained in the new vaccine?

(1) live bacteria that ingest viruses
(2) white blood cells from an infected individual
(3) weakened viruses associated with the infection
(4) a variety of microbes that will attack the virus

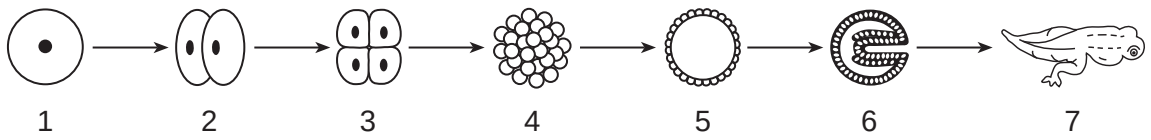
6 The human heart and lungs contain cells that

(1) produce a hormone involved in respiration
(2) have the same genetic information but perform different specialized functions
(3) use one part of the genetic code to synthesize all enzymes needed by the cell
(4) contain different numbers of DNA molecules

7 The diversity of organisms present on Earth is the result of

(1) ecosystem stability
(2) homeostasis
(3) natural selection
(4) direct harvesting

8 Some stages in the development of an organism are represented in the diagram below.



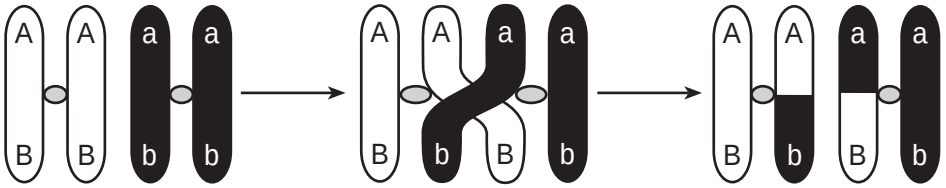
Which levels of biological organization do stages 2 and 7 have in common?

(1) cells and organs
(2) cells and tissues
(3) tissues and organelles
(4) organelles and cells

9 Plants in species *A* cannot fight most fungal infections. Plants in species *B* make a protein that kills many fungi. One possible way for humans to produce species *A* plants with the ability to synthesize this protein would be to

(1) mutate fungal DNA and introduce the mutated DNA into species *B* using a virus
(2) add DNA from species *B* into the soil around species *A*
(3) insert the gene for the protein from species *B* into a chromosome in species *A*
(4) cross species *A* and a fungus to stimulate the synthesis of this protein

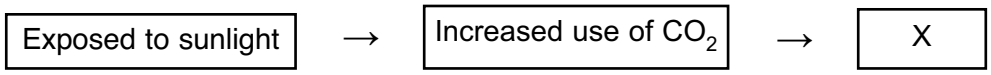
10 The diagram below shows a process that affects chromosomes during meiosis.



This process can be used to explain

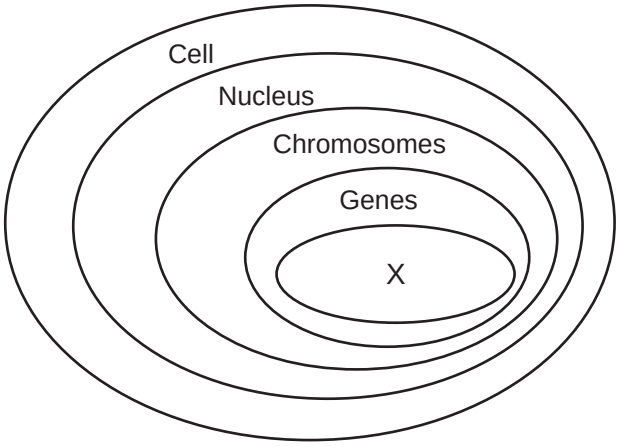
(1) why some offspring are genetically identical to their parents
(2) the process of differentiation in offspring
(3) why some offspring physically resemble their parents
(4) the origin of new combinations of traits in offspring

11 Which phrase, if placed in box *X*, would correctly complete the flowchart shown below?



(1) Increased use of starch in root cells
(2) Increased concentration of glucose in leaf cells
(3) Decreased ATP in root cells
(4) Decreased concentration of oxygen in leaf cells

12 The diagram below represents levels of organization within a cell of a multicellular organism.



The level represented by *X* is composed of

(1) four types of base subunits
(2) folded chains of glucose molecules
(3) twenty different kinds of amino acids
(4) complex, energy-rich inorganic molecules

13 Scientists have discovered that the Oklahoma salamander, *Eurycea tynerensis*, develops into its adult form in streams where the streambeds are made of fine, tightly packed gravel. Salamanders living in streams with streambeds made of large, loosely packed gravel remain immature. This situation is an example of

(1) the production of gametes
(2) faulty genes found in aquatic organisms
(3) development influenced by the environment
(4) the production of new organisms by environmental engineering

14 Which statement is best supported by the theory of evolution?

(1) Genetic alterations occur every time cell reproduction occurs.
(2) The fossil record provides samples of every organism that ever lived.
(3) Populations that have advantageous characteristics will increase in number.
(4) Few organisms survive when the environment remains the same.

15 A chemical known as 5-bromouracil causes a mutation that results in the mismatching of molecular bases in DNA. The offspring of organisms exposed to 5-bromouracil can have mismatched DNA if the mutation occurs in

(1) the skin cells of the mother
(2) the gametes of either parent
(3) all the body cells of both parents
(4) only the nerve cells of the father

16 A species that lacks the variation necessary to adapt to a changing environment is more likely to

(1) develop many mutated cells
(2) become extinct over time
(3) begin to reproduce sexually
(4) develop resistance to diseases

17 A particular species of shark normally reproduces sexually. In captivity, it was found that a female could also reproduce asexually. One *negative* result from asexual reproduction is

(1) increased gene recombinations
(2) increased number of males produced
(3) decreased number of eggs used
(4) decreased biodiversity within the species

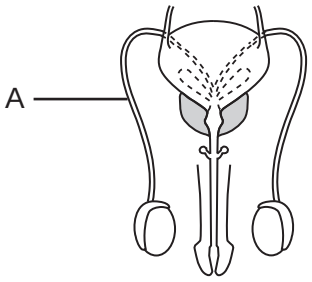
18 Which situation involves a risk to a fetus due to the mother smoking during pregnancy?

(1) decreased digestive activity in the stomach of the fetus
(2) a decrease in the amount of oxygen in the ovary of the mother
(3) inhalation of secondhand smoke by the fetus
(4) toxins in the bloodstream of the mother

19 Drugs to reduce the risk of rejection are given to organ transplant patients because the donated organ contains

(1) foreign antigens
(2) foreign antibodies
(3) DNA molecules
(4) pathogenic microbes

20 A reproductive system is represented in the diagram below.



If an injury occurred to the structure labeled *A*, the most likely result would be a problem with

(1) delivery of sperm
(2) production of gametes
(3) production of hormones
(4) excretion of urine

21 The leaves of a plant are dotted with openings known as stomata. When open, stomata allow the plant to exchange gases and allow moisture to evaporate, helping to draw water from the roots up into the plant. These activities help the plant to

(1) produce light energy
(2) maintain homeostasis
(3) decompose organic matter
(4) synthesize minerals

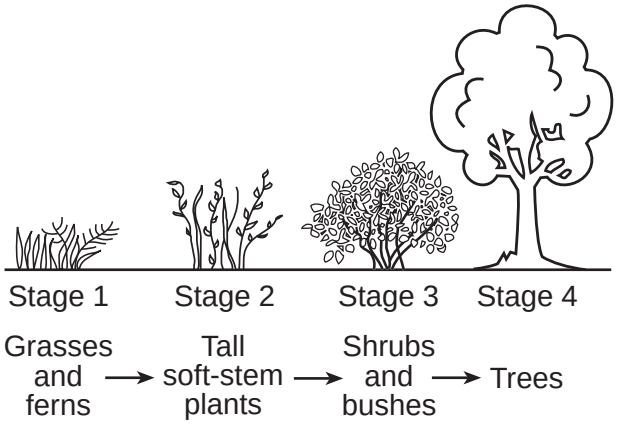
22 A stable ecosystem is characterized by having

(1) predators that outnumber their prey
(2) a continual input of energy
(3) limited autotrophic nutrition
(4) no competition between species

23 The pedigree of Seattle Slew, a racehorse considered by some to be one of the fastest horses that ever lived, includes very fast horses on both his mother's side and his father's side. Seattle Slew most likely was a result of

(1) environmental selection
(2) alteration of DNA molecules
(3) selective breeding
(4) a sudden mutation

24 Changes in an ecosystem over a long period of time are shown in the diagram below.



These changes will most likely lead to a

(1) stable ecosystem that can last for many years
(2) loss of heterotrophs that cannot be recovered
(3) long-term rise in environmental temperatures
(4) forest consisting of only producers and decomposers

25 Which situation indicates a serious organ system malfunction?

(1) The ovary releases estrogen, which quickly binds to cell receptors.
(2) Blood flow throughout the entire body is suddenly reduced.
(3) White blood cells release enzymes in response to the proteins on inhaled pollen.
(4) Mitochondria stop functioning in a unicellular organism exposed to pollutants.

26 Which pair of organisms would most likely compete for the same ecological niche?

(1) bacteria and fungi
(2) deer and wolf
(3) tree and fungi
(4) deer and bacteria

27 Rabbits introduced into Australia over one hundred years ago have become a serious pest. Rabbit populations have increased so much that they have displaced many native species of herbivores. Which statement best explains the reason for their increased numbers?

(1) Rabbits have a high metabolic rate.
(2) There are few native predators of rabbits.
(3) Additional rabbit species have been introduced.
(4) There is an increase in rabbit competitors.

28 Which human activity would preserve finite resources?

(1) deforestation
(2) removing carnivores from a forest
(3) recycling aluminum
(4) heating homes with fossil fuels

29 Abandoned railroad tracks are overgrown with weeds. Ten years later there are small aspen trees growing in the middle of the tracks. This change is an example of

(1) ecological succession
(2) biological evolution
(3) genetic variation
(4) heterotrophic nutrition

30 Which action would be *least* likely to harm endangered species?

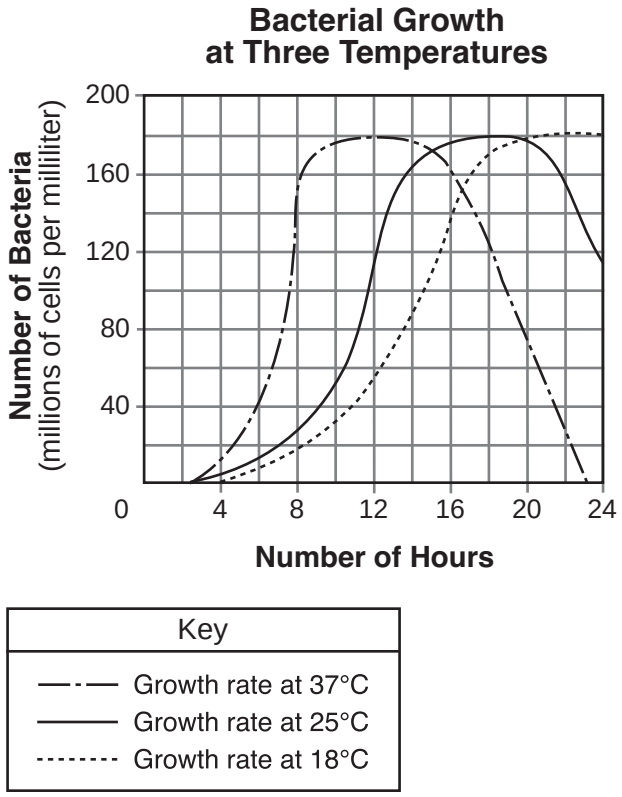
(1) releasing more carbon dioxide into the atmosphere
(2) reducing the human population
(3) decreasing the amount of dissolved oxygen in the oceans
(4) reducing the thickness of the ozone layer

Part B–1

Answer all questions in this part. [13]

Directions (31–43): 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 graph below represents the growth of bacteria cultured at three different temperatures over a period of 24 hours.



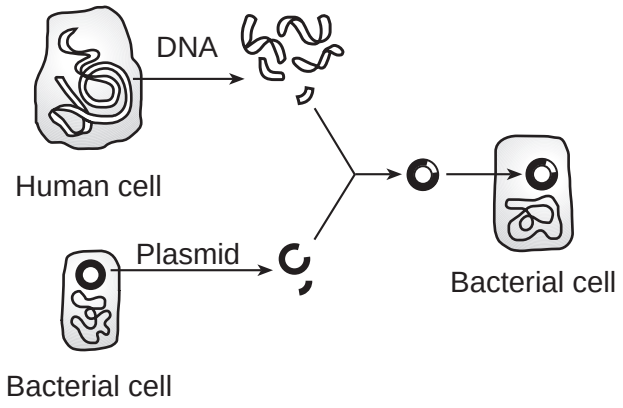
Which statement concerning the rate of cell division in the bacteria culture is correct?

(1) Cell division is most rapid at 37°C between 6 and 8 hours after it began.
(2) Cell division is most rapid at 25°C between 20 and 24 hours after it began.
(3) Cell division is most rapid at 18°C between 4 and 8 hours after it began.
(4) Cell division occurs at the same rate no matter what the temperature.

32 A wet-mount slide preparation of a specimen is stained in order to

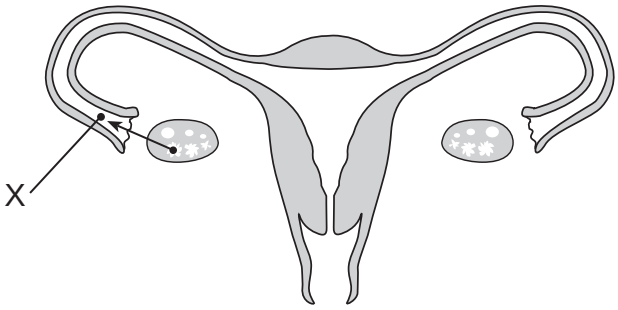
(1) eliminate some organelles
(2) make cell structures more visible
(3) use the high-power lens
(4) remove water from the slide

33 Which set of terms correctly identifies the procedure shown in the diagram below and a substance produced by this procedure?



(1) selective breeding—growth hormone
(2) cloning—antibiotics
(3) genetic engineering—insulin
(4) replicating—glucose

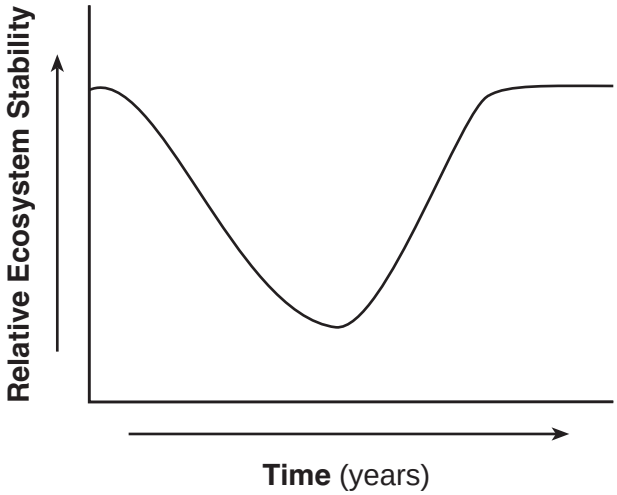
34 The diagram below represents structures found in a human female.



Which process results in the formation of structure *X*?

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

35 The graph below shows changes in the stability of an ecosystem over a period of time.



Which statement best describes the change in ecosystem stability shown in the graph?

(1) A stable ecosystem can be altered, then it can recover to a point of stability.
(2) An ecosystem remains unchanged as its stability decreases.
(3) The stability of an ecosystem remains unchanged but its biodiversity decreases.
(4) A stable ecosystem cannot recover after it is altered.

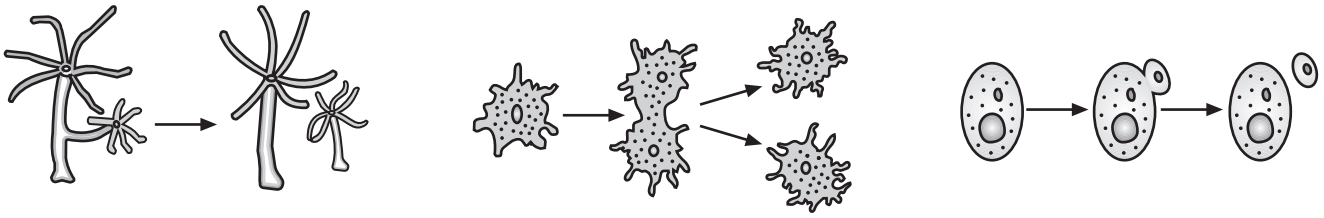
36 Two interactions between organisms are shown in the table below. *X* and *Y* do *not* represent the same organisms in the two interactions.

	Organism X	Organism Y
Interaction 1	predator	prey
Interaction 2	parasite	host

Which statement best describes the relationship between organism *X* and organism *Y* in each interaction?

(1) Organism *X* is positively affected by the relationship and organism *Y* is negatively affected.
(2) Organism *X* is negatively affected by the relationship and organism *Y* is positively affected.
(3) Both organisms are positively affected by the relationship.
(4) Both organisms are negatively affected by the relationship.

37 The diagrams below illustrate types of asexual reproduction.



Which statement correctly describes the offspring?

(1) They vary genetically from the parent.
(2) They are produced by the union of gametes.
(3) They obtain nourishment from a placenta.
(4) They result without the union of gametes.

Base your answer to question 38 on the information below and on your knowledge of biology.

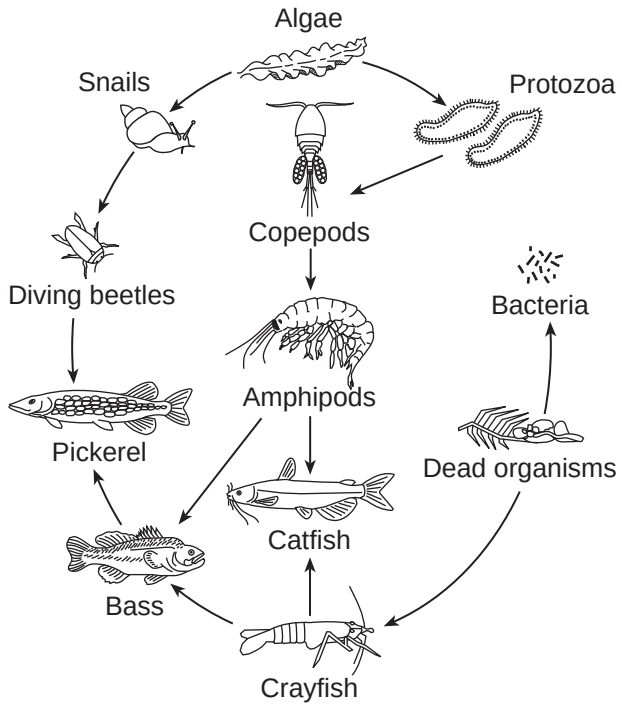
A reporter conducted a number of "on-the-street" interviews with people selected at random. The reporter found that many people gave responses similar to those of the person quoted below.

Question	Response of Person Interviewed
Would you be concerned if winters in this area became more severe and the cost of plowing and sanding snowy roads increased?	Of course I would be concerned. I can't afford higher taxes!
Would you be willing to pay more for a car that has better fuel economy if it would benefit the environment?	No! Cars that would use less gasoline would have to be much smaller. I like my big car—and besides that, it's safer.
If droughts became more common, would you be upset if you had to pay more for your food at the grocery store or a restaurant?	Definitely. My weekly food bill is too high already!
Would it bother you if the sea level increased a foot or two, causing many lowland areas to flood?	Not really. People could always move to higher ground. But I wouldn't want to see my taxes go up because we have to spend more on aid to help them move.
Are you concerned about global warming?	Not really. It doesn't affect me.

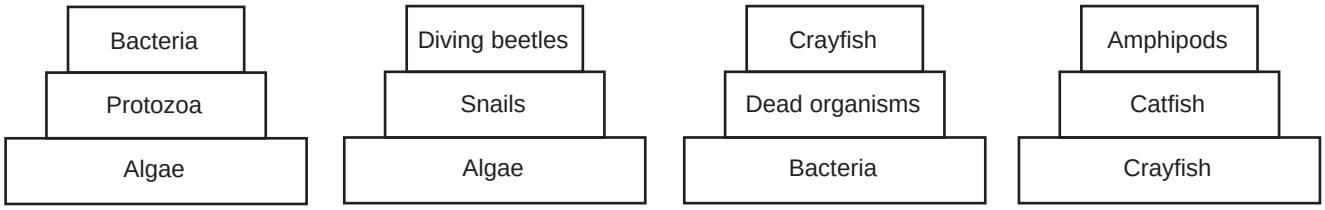
38 Which statement is best supported by these interviews?

(1) Many people are very aware of the possible effects of global warming.
(2) Many people care more about their personal comforts than about the possible effects of global warming.
(3) Many people are willing to sacrifice to reduce the possible effects of global warming.
(4) Many people are now taking action to reduce the possible effects of global warming.

Base your answers to questions 39 and 40 on the diagram below, which represents a pond food web, and on your knowledge of biology.



39 Which energy pyramid most accurately shows the energy relationships between three organisms in this food web?

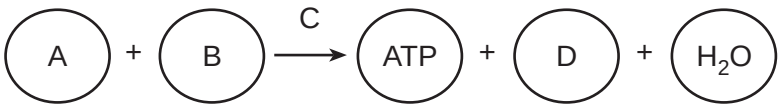


(1) (2) (3) (4)

40 Which statement best describes what will most likely happen if the amphipod population is removed from this food web?

(1) Population sizes of species at feeding levels both before and after amphipods will decrease.
(2) Population sizes of species at feeding levels both before and after amphipods will increase.
(3) Population sizes of species at feeding levels after amphipods will increase and before amphipods will decrease.
(4) Population sizes of species at feeding levels after amphipods will decrease and before amphipods will increase.

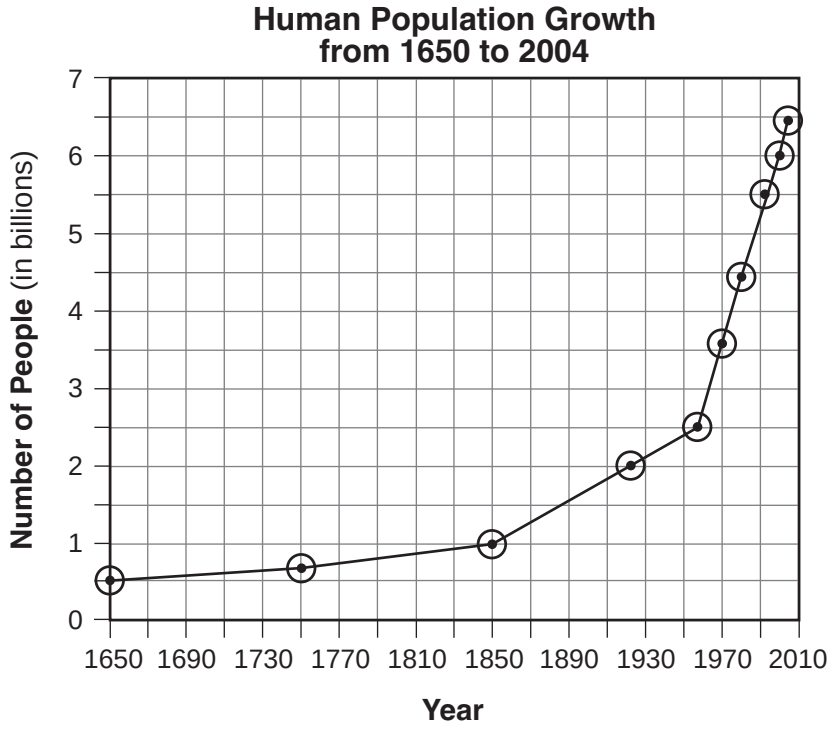
41 A biological process that occurs in both plants and animals is shown below.



Which row in the chart below identifies the lettered substances in this process?

Row	A	B	C	D
(1)	O_2	CO_2	glucose	enzymes
(2)	glucose	O_2	enzymes	CO_2
(3)	enzymes	O_2	CO_2	glucose
(4)	glucose	CO_2	enzymes	O_2

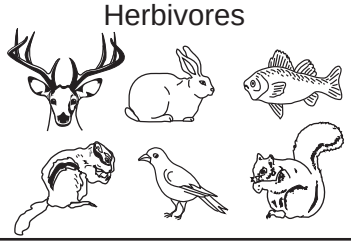
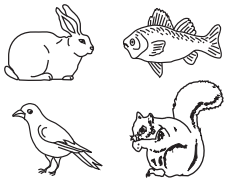
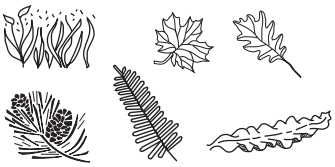
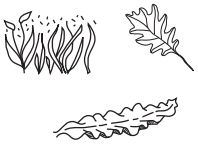
42 The graph below shows data on human population growth.



The trend shown on the graph would most likely result in

(1) a decreased demand for deforestation
(2) an increase in available freshwater
(3) a decrease in air pollution
(4) an increased demand for land use

43 The diagram below represents the varying biodiversity in three ecosystems.

Ecosystem A	Ecosystem B	Ecosystem C
Carnivores 	Carnivores 	Carnivores 
Herbivores 	Herbivores 	Herbivores 
Autotrophs 	Autotrophs 	Autotrophs 
Decomposers 	Decomposers 	Decomposers 

The level of biodiversity in ecosystem *A* is high because it has the

(1) least variety of energy levels
(2) greatest variety of genetic material
(3) greatest number of decomposers
(4) least number of ecological niches

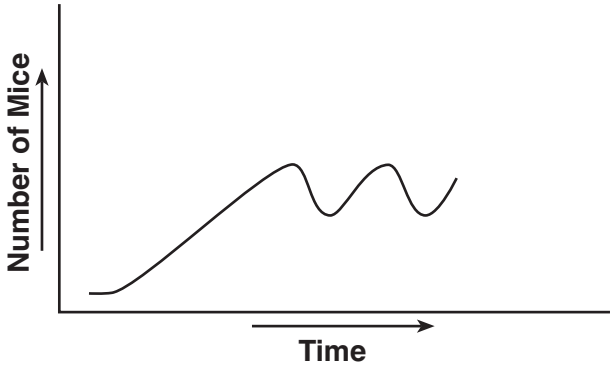
Part B–2

Answer all questions in this part. [12]

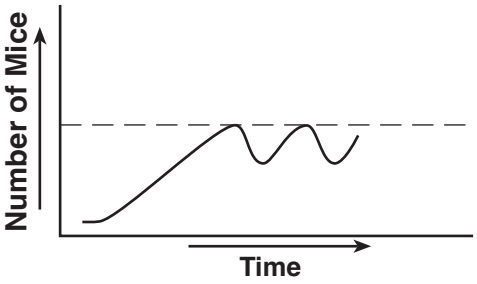
Directions (44–55): For those questions that are followed by four choices, circle the *number* preceding the choice that, of those given, best completes the statement or answers the question. For all other questions in this part, follow the directions given in the question and record your answers in the spaces provided.

For Teacher Use Only

44 The graph below shows the growth of a field mouse population in an ecosystem over time.



The dashed line indicating the carrying capacity for the mouse population is correctly shown on which graph?



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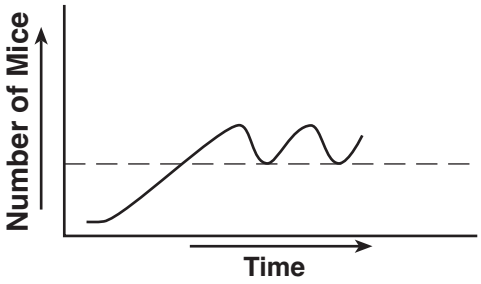
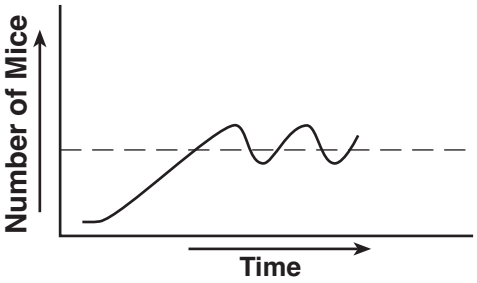


(3)



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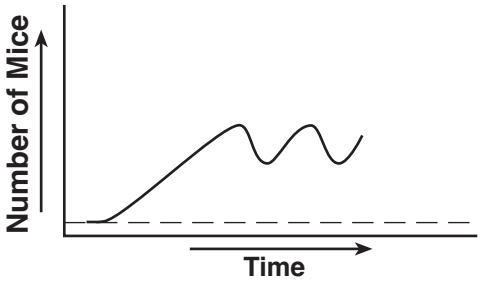


(4)

44 ☐

Base your answers to questions 45 through 48 on the passage below and on your knowledge of biology.

For Teacher Use Only

Sudden Death from a Marine Predator

Members of the Conidae family (cone snails) have been collected for centuries for their beautiful and elaborately detailed shells. Cone snails are marine mollusks found in reef environments throughout the world.

Cone snails feed on organisms such as fish, worms, and other mollusks. They are very slow moving but capture their prey by paralyzing them using venom. The venom contains some of the most deadly neurotoxins known. The neurotoxins work by attaching to receptor molecules on nerves, blocking the transmission of nerve impulses. The neurotoxins are injected into the prey by way of a hollow, spearlike tooth and the effects are usually immediate. One species, a fish-eating cone snail, can paralyze the prey in about two seconds.

The venom produced by each species is prey specific. It may contain two or more different types of neurotoxins, each composed of long chains of amino acids.

45 Explain how a neurotoxin present in the venom can paralyze one type of prey but not another. [1]

_____

_____

45 ☐

46 State *one* way the neurotoxin protein in the venom of cone snails can be different. [1]

_____

_____

46 ☐

47 Explain why paralyzing its prey in only two seconds is an advantage to fish-eating cone snails. [1]

_____

_____

47 ☐

48 Cone snails of the same species often exhibit variations in the patterns of their shells. State *one* possible cause for these variations appearing in the shell pattern within the population of the cone snails. [1]

_____

_____

48 ☐

Base your answers to questions 49 and 50 on the information below and on your knowledge of biology.

Due to the negative effects on the environment of burning coal and oil, society is looking for alternate energy resources that are renewable.

For Teacher Use Only

49 Identify *one* renewable resource that can be used to generate energy. [1]

_____

49 ☐

50 State *one* benefit, other than the fact that it is renewable, of using this resource. [1]

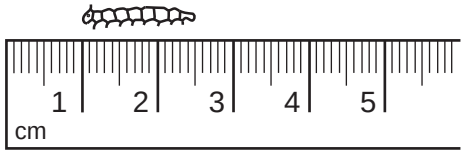
_____

_____

_____

50 ☐

51 A student, using a metric ruler, measured a larva as represented in the diagram below.



What is the length of the larva, in millimeters? [1]

_____ **mm**

51 ☐

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

For Teacher Use Only

An investigation was carried out over a five-year period to measure the effect of color on the survival of trout in a stream. The stream contained many brightly colored stones and food was plentiful. At the start of the investigation (year 0), 100 bright-colored trout and 100 drab-colored trout were placed into a section of the stream that had been blocked with netting. Investigators monitored the trout populations for five years and recorded the water condition each time a count was done. The data collected are shown in the table below.

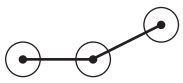
Trout Population Over Five Years

Year	Bright-Colored Trout	Drab-Colored Trout	Condition of Water
0	100	100	clear
1	64	36	clear
2	86	25	clear
3	25	77	cloudy
4	14	86	cloudy
5	90	9	clear

Directions (52–54): Using the information in the data table, construct a line graph on the grid on the following page, following the directions below.

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

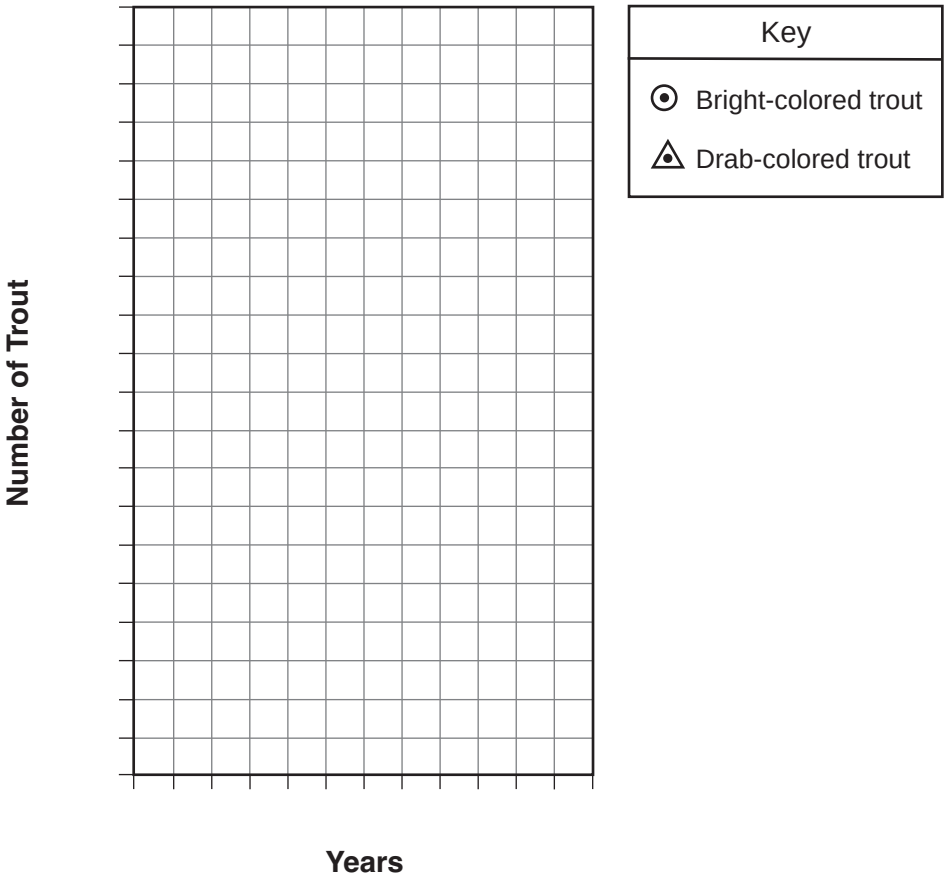
53 Plot the data for the bright-colored trout on the grid. Surround each point with a small circle and connect the points. [1]

Example: 

54 Plot the data for the drab-colored trout on the grid. Surround each point with a small triangle and connect the points. [1]

Example: 

Trout Population Over Five Years



For Teacher Use Only

52 ☐

53 ☐

54 ☐

55 Explain how trout survival is related to the color of trout and the environmental condition of the stream. [1]

_____

_____

_____

55 ☐

Part C

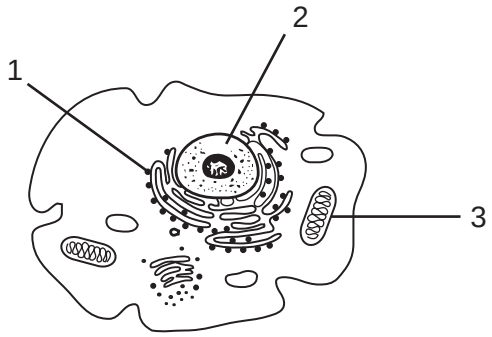
Answer all questions in this part. [17]

Directions (56–62): Record your answers in the spaces provided in this examination booklet.

Base your answer to question 56 on the diagram below and on your knowledge of biology.

For Teacher Use Only

In a cell, a variety of structures perform specific functions and interact to maintain homeostasis. The diagram below represents a typical cell with three cell structures labeled 1, 2, and 3.



56 Select *one* cell structure labeled in the diagram and write its number in the space below. Explain how the cell structure you selected helps maintain homeostasis in a cell. In your answer, be sure to:

- identify the cell structure you selected [1]
- state *one* function of this cell structure [1]
- identify *one* substance that is often associated with the cell structure you selected and state how that substance is associated with the cell structure [1]
- identify *one* other cell structure and explain how it interacts with the cell structure you selected to maintain homeostasis in the cell [1]

Cell structure number: _____

_____

_____

_____

_____

_____

_____

_____

_____

56 ☐

57 The table below lists enzymes that function in different locations in the human body, and the temperature and pH ranges of these locations.

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Enzyme	Location	Temperature (°C)	pH
ptyalin	mouth	36.7–37.0	6.5–7.0
pepsin	stomach	37.3–37.6	1.0–3.0
trypsin	small intestine	37.3–37.6	7.5–9.0

Different enzymes are secreted in each of the three locations. Ptyalin digests carbohydrates. Pepsin and trypsin both digest proteins. Discuss the activity of these enzymes. In your answer, be sure to:

- state how the activity of pepsin will most likely change after it moves with the food from the stomach to the small intestine [1]
- support your answer using data from the table [1]
- state how a fever of 40°C would most likely affect the activity of these enzymes and support your answer [1]
- identify the characteristic of enzymes that prevents ptyalin and trypsin from digesting the same type of food [1]

57 ☐

58 Consuming large volumes of soft drinks containing sugar during the day can disrupt homeostasis. Describe how the human body responds to restore sugar balance. In your answer, be sure to:

- identify the hormone responsible for restoring homeostasis [1]
- identify the organ that releases this hormone [1]
- state *one* possible reason why sugar levels may remain high even though this hormone has been released [1]

_____

_____

_____

_____

_____

_____

58 ☐

59 Each of the environmental problems listed below has had an impact on ecosystems.

increased ultraviolet radiation
global warming

Select *one* of these problems and write it in the space below. Explain how this problem has affected an ecosystem. In your answer, be sure to:

- identify *one* specific cause of the environmental problem [1]
- identify *one* organism that has been affected by the problem and state *one* way that organism has been affected [1]
- state *one* action that can be taken to lessen the impact of this problem on the environment [1]

Problem: _____

_____

_____

_____

_____

_____

_____

59 ☐

For Teacher Use Only

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

For Teacher Use Only

In the abyssal zones (deepest zones) of oceans, organisms live in an ecosystem that lacks sunlight. Other environmental conditions include temperatures of 4°C and extremely high water pressure. Dead material from upper ocean zones sinks and settles in the abyssal zone.

60 State *one* possible way that some organisms living permanently in the abyssal zone could obtain energy. [1]

_____

_____

60 ☐

61 Many of the animals in the abyssal zone possess light-producing cells in specific parts of their bodies. State *one* possible use for these lights. [1]

_____

_____

61 ☐

62 Animals from the abyssal zone can *not* survive in upper ocean zones. State *one* possible reason for this. [1]

_____

_____

62 ☐

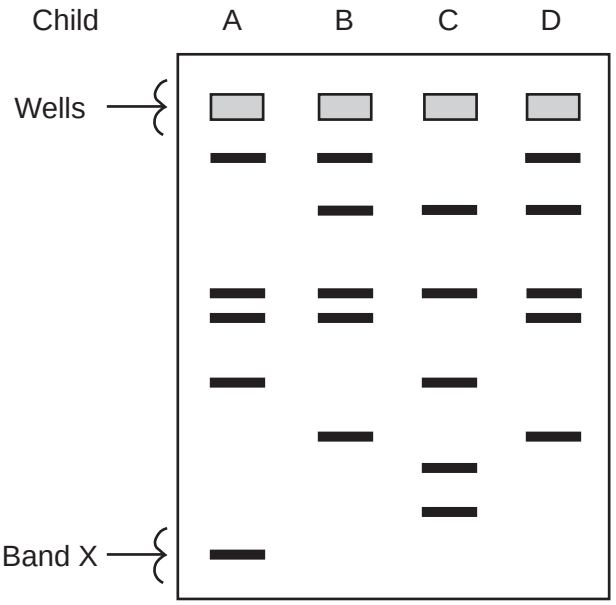
Part D

Answer all questions in this part. [13]

Directions (63–75): For those questions that are followed by four choices, circle the *number* of the choice that, of those given, best completes the statement or answers the question. For all other questions in this part, follow the directions given in the question and record your answers in the spaces provided.

Base your answers to questions 63 through 66 on the information and diagram below and on your knowledge of biology.

DNA samples were collected from four children. The diagram below represents the results of a procedure that separated the DNA in each sample.



63 Identify the procedure used to obtain these results. [1]

_____

64 Band *X* represents the

(1) largest fragment of DNA that traveled the fastest

(2) smallest fragment of DNA that traveled the fastest

(3) largest fragment of DNA that traveled the slowest

(4) smallest fragment of DNA that traveled the slowest

For Teacher Use Only

63 ☐

64 ☐

65 The DNA is most similar in which two children? Support your answer. [1]

_____

_____

For Teacher Use Only

65 ☐

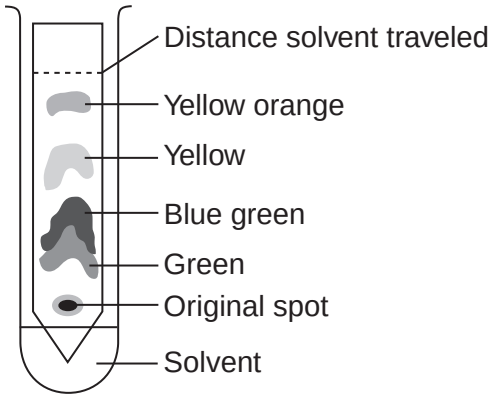
66 State *one* way information obtained from this procedure can be used. [1]

_____

_____

66 ☐

67 A technique used to analyze pigments in spinach leaves is shown in the diagram below.



This technique is known as

(1) paper chromatography

(2) gene manipulation

(3) dissection

(4) staining

67 ☐

For Teacher Use Only

68 A student conducted an experiment to determine if listening to different types of music would affect pulse rate. She thought that pulse rate would change with different types of music. Each person participating in her experiment listened to seven different selections of music for 30 seconds each. The pulse rates were taken after each 30-second interval of music. Based on her experiment, the student concluded that a person's pulse rate changed when listening to different types of music.

The component missing from this experiment is a

(1) prediction

(2) hypothesis

(3) control group

(4) research plan

68 ☐

69 An experiment was carried out to determine whether drinking caffeinated soda increases pulse rate. The pulse rates of two groups of people at rest were measured. Group *A* was then given caffeinated soda and group *B* was given caffeine-free soda. One hour after drinking the soda, the pulse rates were measured. The participants in the experiment were all the same age, and they were all given the same amount of soda.

The dependent variable in this experiment is the

(1) type of soda given to each group

(2) amount of soda given to each group

(3) pulse rate of each group

(4) age of participants in each group

69 ☐

Base your answer to question 70 on the information below and on your knowledge of biology.

> A student states that exercise will affect the number of times a person can squeeze a clothespin in a certain amount of time. An experiment is carried out to test this hypothesis. One group of ten students sits quietly before squeezing a clothespin as many times as possible during a one-minute interval. A second group of ten students does 25 jumping jacks before squeezing a clothespin as many times as possible during a one-minute interval.

70 State *one* way the experiment could be improved in order to increase the validity of the results. [1]

_____

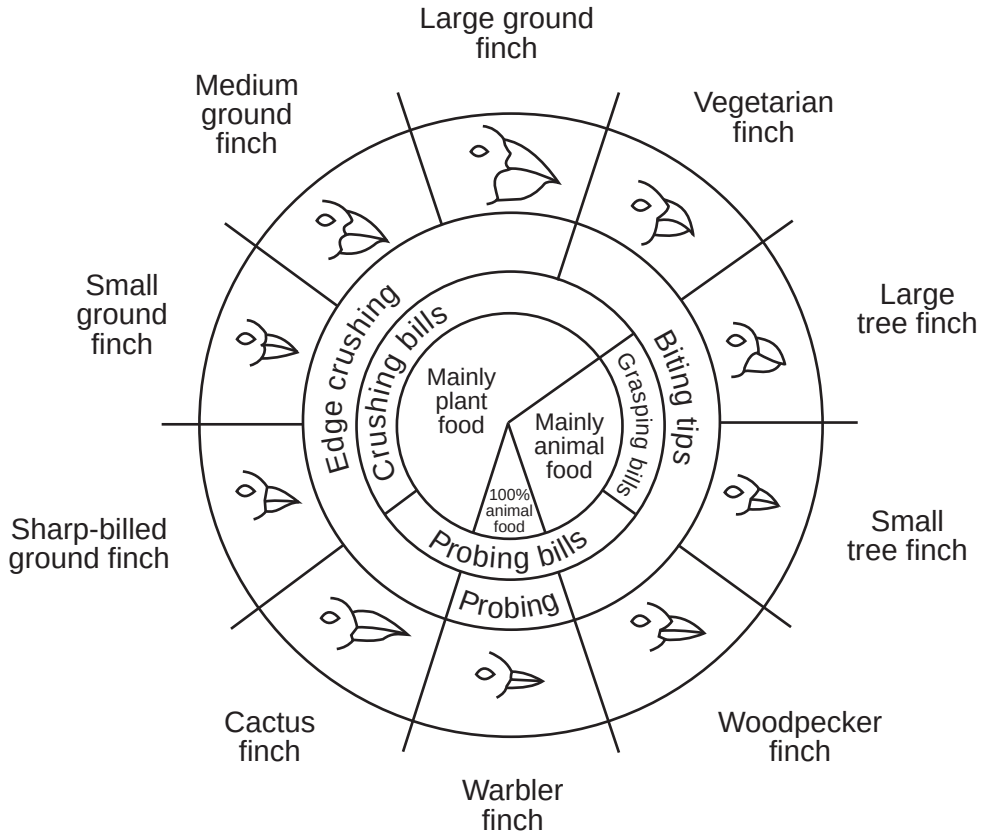
_____

70 ☐

Base your answer to questions 71 and 72 on the information in the diagram below and on your knowledge of biology.

For Teacher Use Only

Finch Diversity



—From *Galapagos: A Natural History Guide*

71 Small ground finches and medium ground finches live on an island with abundant plant and animal food. Predict how the small ground finch and the medium ground finch would be affected if warbler finches migrated to the island where these finches live. Support your answer. [1]

_____

_____ 71 ☐

72 The differences observed in the bird beaks are most likely due to

(1) asexual reproduction of these finch species

(2) the selection for different shaped beaks that best suit different niches

(3) the genetic recombination associated with mitotic cell division

(4) the genetic engineering of the DNA of each of these species 72 ☐

Base your answers to questions 73 through 75 on the laboratory setup illustrated below and on your knowledge of biology.

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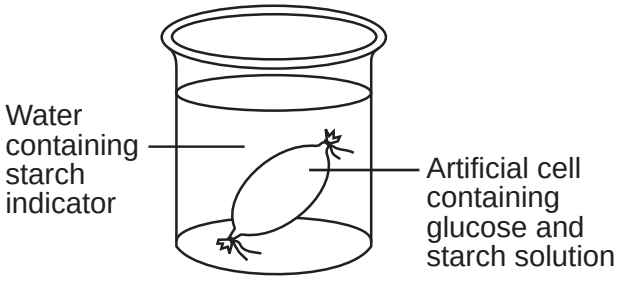

73 Identify the color of the contents of the artificial cell after two hours. [1]

_____

73 ☐

74 After two hours, the color of the liquid in the beaker did *not* change. This shows that

(1) glucose moved from the artificial cell into the beaker

(2) starch did not pass out of the artificial cell

(3) starch was digested to glucose in the artificial cell

(4) glucose molecules combined to produce starch in the artificial cell

74 ☐

75 This laboratory setup would most likely be used to demonstrate

(1) carbohydrate synthesis

(2) active transport

(3) diffusion

(4) dehydration

75 ☐

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Wednesday, August 18, 2010 — 12:30 to 3:30 p.m., only

ANSWER SHEET

Student ..... Sex: ☐ Female ☐ Male

Teacher .....

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

Part	Maximum Score	Student's Score
A	30	
B–1	13	
B–2	12	
C	17	
D	13	
Total Raw Score (maximum Raw Score: 85)		
Final Score (from conversion chart)		

Raters' Initials

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

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

Part A

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

Part A Score

Part B–1

31	38 .....
32	39 .....
33	40 .....
34	41 .....
35	42 .....
36	43 .....
37	

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

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FOR TEACHERS ONLY

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

LE

LIVING ENVIRONMENT

Wednesday, August 18, 2010 — 12:30 to 3:30 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

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

Part B–1

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

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. On the front of the student's detachable answer sheet, raters must enter their initials on the lines next to "Rater 1" or "Rater 2."

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 Wednesday, August 18, 2010. 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

44 2

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

— The prey must contain the receptor for that particular neurotoxin to produce its effect.
— The neurotoxin usually binds to a specific receptor.
— The neurotoxins are prey specific.

46 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The amino acid sequence can be different.
— The number of amino acids can be different.

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

— Since the snail moves very slowly, its prey does not have a chance to swim away.
— so prey don't get away

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

— DNA differences
— mutations
— gene recombination
— environmental conditions

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

— wind
— running water
— the Sun/solar energy
— geothermal

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

— may pollute less
— no greenhouse gases

Note: Allow credit for an answer that is consistent with the student's response to question 49.

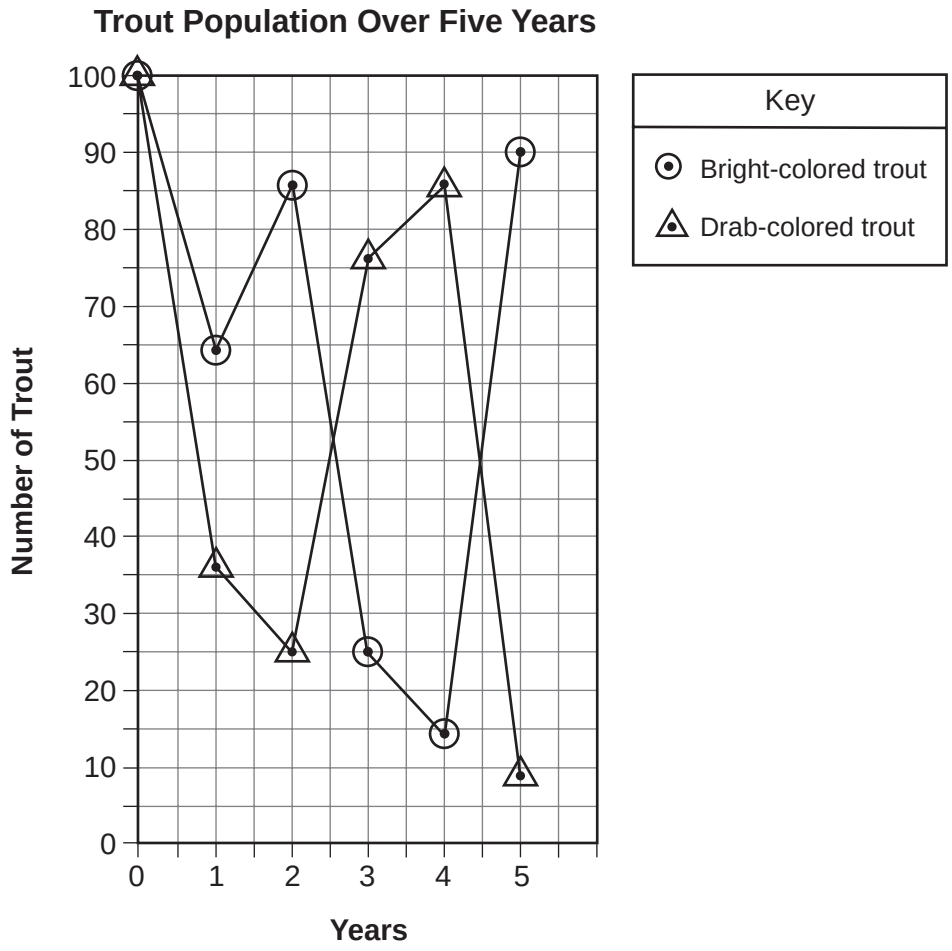
51 [1] Allow 1 credit for 15 mm ± 2 mm.

52 [1] Allow 1 credit for marking an appropriate scale on each labeled axis.

53 [1] Allow 1 credit for correctly plotting the data for the bright-colored trout, surrounding each point with a small circle, and connecting the points.

54 [1] Allow 1 credit for correctly plotting the data for the drab-colored trout, surrounding each point with a small triangle, and connecting the points.

Example of a 3-credit graph for questions 52–54:



Note: Allow credit only if circles and triangles are used.
Make no assumptions 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), or for extending lines beyond the data points.
Do *not* deduct more than 1 credit for plotting points that are not in the data table or for extending lines beyond the data points.

[4]

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

— Drab-colored trout survive better in cloudy water because they blend in with water.

— Brightly colored trout survive better in clear water because they blend in with the brightly colored stones.

Part C

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

- Allow 1 credit for identifying the cell structure selected.
- Allow 1 credit for stating *one* function of the cell structure.
- Allow 1 credit for identifying *one* substance that is often associated with the cell structure selected and for stating how that substance is associated with the cell structure.
- Allow 1 credit for identifying *one* other cell structure and explaining how it interacts with the cell structure selected to maintain homeostasis in the cell.

Note: Allow credit for each bulleted response that correctly describes the structure identified by the student in bullet one (i.e., allow 3 credits if the student incorrectly identifies structure 1 as a mitochondrion but correctly describes a mitochondrion in bullets 2 through 4).

Examples of 4-credit responses:

Structure 1

- ribosome
- site of protein synthesis
- amino acid — used to make proteins
- nucleus — the ribosome gets instructions from the nucleus determining which proteins are produced by the cell

Structure 2

- nucleus
- control of cell processes
- DNA — makes up the chromosomes in the nucleus
- ribosome — nucleus sends instructions to ribosomes for protein synthesis

Structure 3

- mitochondrion
- site of energy release/cell respiration
- ATP — produced in the mitochondrion
- cell membrane — allows glucose to enter cell and be used by the mitochondrion for energy release

57 [4] Allow a maximum of 4 credits, allocated as follows:

- Allow 1 credit for stating how the activity of pepsin will most likely change after it moves with the food from the stomach to the small intestine. Acceptable responses include, but are not limited to:

  — Pepsin will either stop functioning or slow down.

- Allow 1 credit for supporting the answer using data from the table. Acceptable responses include, but are not limited to:

  — This is because the pH range in the small intestine is 7.5 to 9.0 and pepsin normally functions at 1.0 to 3.0.

- Allow 1 credit for stating how a fever of 40°C would most likely affect the activity of these enzymes and for supporting the answer. Acceptable responses include, but are not limited to:

  — A fever of 40°C could slow/stop enzyme functioning, since these enzymes work best at around 37°C.

- Allow 1 credit for identifying the characteristic of enzymes that prevents ptyalin and trypsin from digesting the same type of food. Acceptable responses include, but are not limited to:

  — Ptyalin and trypsin cannot both digest the same type of food because enzymes are specific.

  — They have different shapes.

58 [3] Allow a maximum of 3 credits, allocated as follows:

- Allow 1 credit for identifying the hormone responsible for restoring homeostasis as insulin.

- Allow 1 credit for identifying the organ that releases this hormone as the pancreas.

- Allow 1 credit for stating *one* possible reason why sugar levels may remain high even though this hormone has been released. Acceptable responses include, but are not limited to:

  — Not enough insulin is released.

  — The person has diabetes.

  — There are not many insulin receptors.

59 [3] Allow a maximum of 3 credits, allocated as follows:

- Allow 1 credit for identifying *one* specific cause of the environmental problem. Acceptable responses include, but are not limited to:

  — increased ultraviolet radiation: thinning of the protective ozone shield

  — global warming: deforestation *or* increase in carbon dioxide in the atmosphere

Note: Do *not* accept just pollution.

- Allow 1 credit for identifying *one* organism that has been affected by the problem and stating *one* way that organism has been affected. Acceptable responses include, but are not limited to:

  — increased ultraviolet radiation: Humans have developed skin cancers.

  — global warming: Polar bear habitat is being reduced in size.

- Allow 1 credit for stating *one* action that can be taken to lessen the impact of this problem on the environment. Acceptable responses include, but are not limited to:

  — increased ultraviolet radiation: continue to ban the use of CFCs/don't use CFCs

  — global warming: reforest/plant trees *or* use alternative energy sources

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

— They obtain energy from living or dead organisms that descend from the upper levels.

— Wastes from above drop down.

— feeding on organisms that live there

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

— attract food organisms

— attract a mate

— find food

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

— not enough pressure

— too warm

— not adapted to that environment

— no food they normally eat

Part D

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

— electrophoresis
— gel electrophoresis
— DNA fingerprinting

64 2

65 [1] Allow 1 credit for *B* and *D* and for supporting the answer. Acceptable responses include, but are not limited to:

— most similar because they have the most bands in common

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

— to determine paternity/maternity
— to help solve a crime
— to identify an accident victim
— to diagnose disorders

67 1

68 3

69 3

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

— increase the number of students in each group
— repeat the experiment several times

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

— There would be no effect because they eat different food.

— The ground finch populations may increase if the warbler finch eats animals that consume the same plants eaten by the ground finches.

— The ground finch populations may decrease if the warbler finch competes for nesting sites.

72 2

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

— blue black

74 2

75 3

The *Chart for Determining the Final Examination Score for the August 2010 Regents Examination in Living Environment* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Wednesday, August 18, 2010. 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

August 2010 Living Environment

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

Part D 63–75	
Lab 1	63, 64, 65, 66, 67
Lab 2	68, 69, 70
Lab 3	71, 72
Lab 5	73, 74, 75

University of the State of New York
State Education Department

Regents Examination in Living Environment
August 2010

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

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 Regents Examination in Living Environment.