FOR TEACHERS ONLY

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

LE

LIVING ENVIRONMENT

Friday, January 27, 2006 — 9:15 a.m. to 12:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

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

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Visit the site http://www.emsc.nysed.gov/osa/ and select the link "Latest Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and at least one more time before the final scores for the examination are recorded.

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

Part A

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

Part B–1

31	**4**	35	**1**
32	**3**	36	**2**
33	**3**	37	**4**
34	**3**	38	**1**

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

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

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

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

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

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

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

Raters should enter the scores earned for Part A, Part B–1, Part B–2, Part C, and Part D on the appropriate lines in the box printed on the answer sheet and should add these 5 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 Friday, January 27, 2006. The student's scaled score should be entered in the box labeled "Final Score" on the student's answer booklet. 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

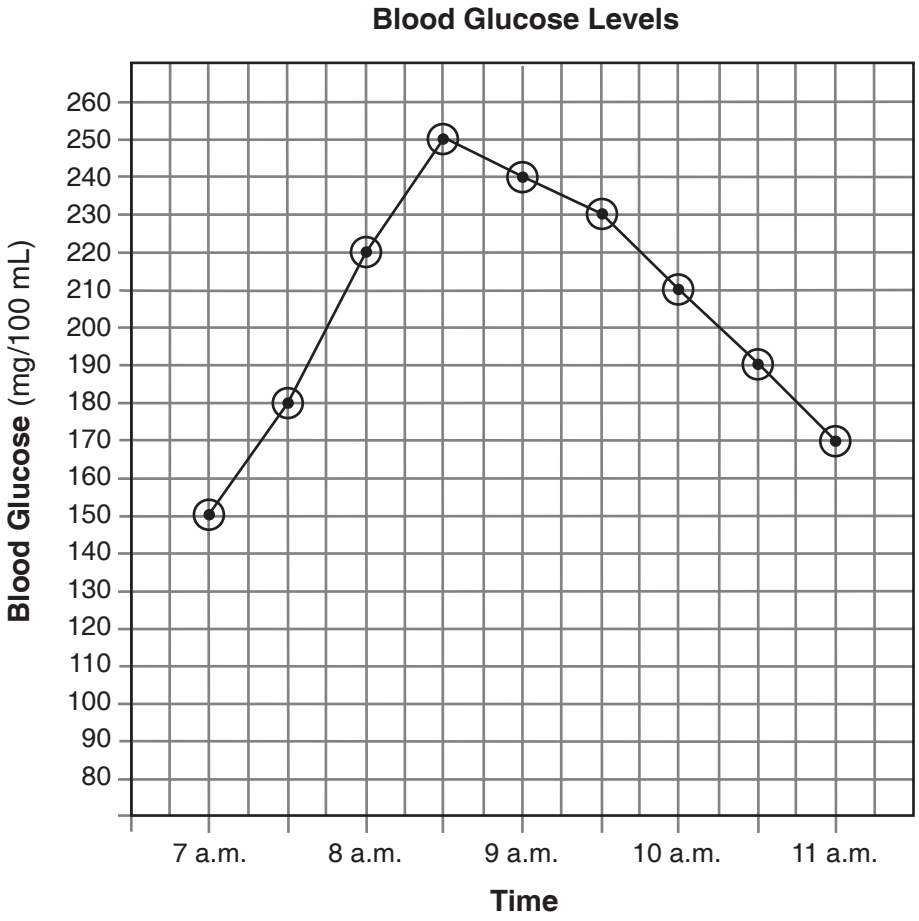
39 Allow 1 credit for marking an appropriate scale on each labeled axis.

40 Allow a maximum of 2 credits, allocated as follows:

- Allow 1 credit for picking only individual 2 to plot.
- Allow 1 credit for correctly plotting the data *for either individual*, surrounding each point with a small circle, and connecting the points.

Note: Credit may be allowed if data is plotted correctly but the points are not circled.

Example of a 3-credit response for questions 39 and 40:



41 Allow 1 credit for identifying chemical *X* as insulin.

42 Allow 1 credit for stating one reason for the change in blood glucose level between 7 a.m. and 8 a.m. Acceptable responses include, but are not limited to:

— They had a meal containing carbohydrates.
— They had breakfast.
— digestion
— absorption

43 Allow 1 credit for homeostasis *or* steady state *or* dynamic equilibrium.

44 Allow 1 credit for describing one possible effect of LSD on the action of acetylcholine. Acceptable responses include, but are not limited to:

— Cell communication would be disrupted.
— The work of acetylcholine would occur continuously.
— Nerve signals would not be turned off.

45 Allow 1 credit for stating what might happen to some of the remaining energy mice obtain from the plants they eat after they store a small amount of it. Acceptable responses include, but are not limited to:

— Much of the energy is lost as heat (during cellular respiration).
— Some of the energy is used by the mice for life functions.

46 Allow 1 credit for stating one reason that most foods must be digested before they can enter a cell. Acceptable responses include, but are not limited to:

— Food must be digested before it can enter a cell since certain food molecules are too large to pass through the cell membrane.
— Only small molecules can pass through membrane pores.

47 Allow 1 credit for a correct definition of a mutation. Acceptable responses include, but are not limited to:

— a change in a gene
— a change in DNA code
— a change in an allele

48 3

49 Allow 1 credit for explaining why the percentage of the population with one mutant sickle-cell gene is higher in areas where malaria is common. Acceptable responses include, but are not limited to:

— The gene is beneficial to people who have only one copy.
— The allele makes people resistant to malaria.
— People with one gene survive malaria and pass the gene on to offspring.

50 Allow 1 credit for stating how the pH of these Adirondack lakes changed between 1880 and 1980. Acceptable responses include, but are not limited to:

— The pH decreased.
— The lakes became more acidic.
— The pH dropped from about 6.8 to about 4.8.

51 Allow 1 credit for stating the effect that the pH change in these Adirondack lakes had on lake trout, brown trout, smallmouth bass, and mussels. Acceptable responses include, but are not limited to:

— Their populations decreased.
— Their survival rate decreased.
— There are not as many trout, bass, and mussels.
— They died.

52 Allow 1 credit for identifying the cellular process that most likely produced the CO_2 in the body cell. Acceptable responses include, but are not limited to:

— respiration
— cellular respiration

53 Allow 1 credit for explaining why carbon dioxide moves into red blood cells by diffusion rather than by active transport. Acceptable responses include, but are not limited to:

— Carbon dioxide is moving from high to low concentration.
— Active transport moves materials from low to high concentration and the CO_2 is moving from high to low.

54 Allow 1 credit for stating what would happen to the production of bicarbonate ions (HCO_3^-) if the carbonic anhydrase were *not* present in red blood cells. Acceptable responses include, but are not limited to:

— Bicarbonate ion (HCO_3^-) production would decrease (or stop).
— CO_2 would not become part of HCO_3^-.

Part C

55 Allow 1 credit for identifying one specific pathogen found in ground beef. Acceptable responses include, but are not limited to:

— *E. coli.*
— bacteria

56 Allow 1 credit for identifying the specific group of molecules found in bacteria whose function would be interfered with by heating them to 160° F. Acceptable responses include, but are not limited to:

— enzymes
— proteins

57 Allow 1 credit for explaining how irradiation helps preserve meat. Acceptable responses include, but are not limited to:

— Irradiation kills the bacteria that cause the meat to spoil.
— disrupts the structure of bacteria that cause the meat to spoil

58 Allow 1 credit for explaining how irradiation could interfere with the process of reproduction in bacteria that survive the irradiation. Acceptable responses include, but are not limited to:

— It causes mutations.
— Essential enzymes are destroyed.
— Irradiation disrupts the structure of bacterial DNA so that it cannot replicate properly.

59 Allow of maximum of 5 credits for discussing photosynthesis or respiration, allocated as follows:

- Allow 1 credit for identifying the organelle where the process occurs.

  Photosynthesis: — chloroplast
  Respiration: — mitochondrion

- Allow 1 credit for identifying two raw materials necessary for the process. Acceptable responses include, but are not limited to:

  Photosynthesis:
  — CO_2 and H_2O
  Respiration:
  — organic molecules and O_2
  — sugar and oxygen

- Allow 1 credit for identifying one energy-rich molecule that is produced by the process. Acceptable responses include, but are not limited to:

  Photosynthesis:
  — glucose
  Respiration:
  — ATP

- Allow 1 credit for stating how organisms use the energy-rich molecule that is produced. Acceptable responses include, but are not limited to:

  Glucose:
  — to produce ATP
  — to produce starch
  ATP:
  — to provide energy for metabolism

- Allow 1 credit for stating how a gas produced by the process is recycled in nature. Acceptable responses include, but are not limited to:

  Photosynthesis:
  — The gas is used for respiration.
  — provides O_2 for respiration
  Respiration:
  — provides CO_2 for photosynthesis
  — The gas is used for photosynthesis.

60 Allow a maximum of 3 credits for discussing the use of pesticides to control the mosquito population, allocated as follows:

- Allow 1 credit for stating one advantage of killing all of the mosquitoes. Acceptable responses include, but are not limited to:

  — Killing all the mosquitoes will end the West Nile virus infections of people.
  — People will get fewer mosquito bites.

- Allow 1 credit for stating one disadvantage of killing all of the mosquitoes. Acceptable responses include, but are not limited to:

  — Killing all the mosquitoes will reduce the food supply for bats and birds.
  — Fish that rely on mosquito larvae for food will have less food.

- Allow 1 credit for stating one danger to humans of spraying pesticides into the air. Acceptable responses include, but are not limited to:

  — Pesticides can enter food and water supplies (causing illness).
  — People may breathe in the pesticide.

61 Allow a maximum of 5 credits for discussing the issues the farmer should take into account before making a decision, allocated as follows:

- Allow 1 credit for stating how a cloned flock would be different from a noncloned flock. Acceptable responses include, but are not limited to:

  — There would be no variation.
  — All would be identical genetic copies, unlike noncloned herds, where much genetic diversity would be present.
  — All sheep would be the same.

- Allow 1 credit for stating one advantage of having a cloned flock. Acceptable responses include, but are not limited to:

  — All sheep would have one or more desired traits (that the original individual possessed).

- Allow 1 credit for stating one disadvantage of having a cloned flock. Acceptable responses include, but are not limited to:

  — Since all are the same, the entire flock could be lost if a disease to which they have no resistance were to infect them.
  — The sheep may have a genetic flaw.
  — shorter life span

- Allow 1 credit for stating that they would all be the same sex, so they could not mate with each other.

- Allow 1 credit for stating one reason that the offspring resulting from breeding these sheep with an unrelated sheep would not all be the same. Acceptable responses include, but are not limited to:

  — Both parents contribute genes to the offspring.
  — Different gene combinations will result.

Part D

62 Allow 1 credit for stating that the unknown plant species is most closely related to species *C* and supporting that answer. Acceptable responses include, but are not limited to:

— It is most closely related to species *C*. The bands from the DNA of species *C* are the closest match to those of the unknown species.

63 Allow 1 credit for identifying one physical characteristic of plants that can be readily observed and compared to help determine the relationship between two different species of plants. Acceptable responses include, but are not limited to:

— structure of flowers
— structure of leaves
— structure of stems
— structure of seeds
— structure of pollen

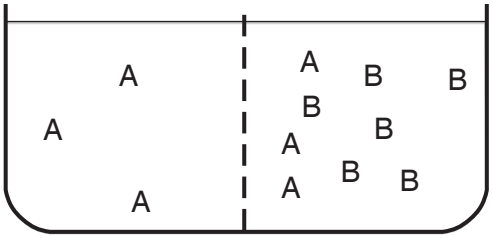
64 Allow 1 credit for explaining why comparing the DNA of the unknown and known plant species is probably a more accurate method of determining relationships than comparing only the physical characteristic identified in question 63. Acceptable responses include, but are not limited to:

— The physical characteristic chosen may be the only characteristic the organisms have in common, while the more similar the DNA, the more characteristics the organisms have in common.

65 4

66 Allow a maximum of 2 credits, 1 for indicating that there will be three molecules of *A* in each chamber and 1 for indicating that there will be six molecules of *B* in the right chamber.

Example of a 2-credit response



67 Allow 1 credit for circulatory system**.**

68 Allow 1 credit for identifying another body system that would have its activity altered. Acceptable responses include, but are not limited to:

— respiratory system
— excretory system

69 Allow 1 credit for stating the effect exercise would have on the system identified in question 68. Acceptable responses include, but are not limited to:

Respiratory:
— increased breathing rate
Excretory:
— increased perspiration

70 Allow 1 credit for explaining how the change in pulse rate helps maintain homeostasis in muscle cells. Acceptable responses include, but are not limited to:

— An increased pulse rate indicates an increased blood flow that carries excess carbon dioxide away from the muscle cells.
— More oxygen is carried to the muscle cells.
— The increased blood flow carries excess heat away from the muscle cells.

71 Allow 1 credit for stating an appropriate control for the experiment. Acceptable responses include, but are not limited to:

— no music being played while the pulse is being taken
— silence while the pulse is being taken

72 Allow 1 credit for explaining that the model cell that was placed in 100% water increased in mass because water diffused into the model cell.

73 Allow 1 credit for stating that the concentration of water in the original blue solution was 80% and for stating evidence in support of this answer. Acceptable responses include, but are not limited to:

— 80%, because the model cell did not increase in mass
— 80%, because the model cell did not change
— According to the table, when the mass of the model cell is 10 grams, the concentration of water outside the model cell is 80%. This would be the same as the concentration of water inside the model cell.

The *Chart for Determining the Final Examination Score for the January 2006 Regents Examination in Living Environment* will be posted on the Department's web site http://www.emsc.nysed.gov/osa on Friday, January 27, 2006. 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.

Map to Core Curriculum

January 2006 Living Environment

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

Part D 62–73	
Lab 1	62,63,64,65
Lab 2	67,68,69,70,71
Lab 3	
Lab 5	66,72,73