FOR TEACHERS ONLY

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

PS–P

PHYSICAL SETTING/PHYSICS

Tuesday, June 22, 2010 — 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 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 . . . . **2**	13 . . . . **2**	25 . . . . **2**
2 . . . . **3**	14 . . . . **4**	26 . . . . **1**
3 . . . . **3**	15 . . . . **3**	27 . . . . **4**
4 . . . . **4**	16 . . . . **3**	28 . . . . **3**
5 . . . . **4**	17 . . . . **2**	29 . . . . **1**
6 . . . . **1**	18 . . . . **2**	30 . . . . **1**
7 . . . . **2**	19 . . . . **1**	31 . . . . **3**
8 . . . . **1**	20 . . . . **2**	32 . . . . **4**
9 . . . . **4**	21 . . . . **3**	33 . . . . **1**
10 . . . . **4**	22 . . . . **2**	34 . . . . **3**
11 . . . . **3**	23 . . . . **3**	35 . . . . **2**
12 . . . . **3**	24 . . . . **4**	

Part B–1

36 . . . . **2**	44 . . . . **3**
37 . . . . **4**	45 . . . . **1**
38 . . . . **2**	46 . . . . **4**
39 . . . . **4**	47 . . . . **1**
40 . . . . **3**	48 . . . . **3**
41 . . . . **2**	49 . . . . **1**
42 . . . . **4**	50 . . . . **3**
43 . . . . **3**	

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Physical Setting/Physics examination. Additional information about scoring is provided in the publication *Information 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.

For Part A and Part B–1, indicate by means of a check mark each incorrect or omitted answer. In the box provided at the end of each part, record the number of questions the student answered correctly for that part.

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.

Fractional credit is *not* allowed. Only whole-number credit may be given to a response. 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, and Part C on the appropriate lines in the box printed on the answer booklet, and then should add these four scores and enter the total in the box labeled "Total Written Test Score." Then, the student's raw score on the written test should be converted to a scale score by using the conversion chart that will be posted on the Department's web site: http://www.emsc.nysed.gov/osa/ on Tuesday, June 22, 2010. The student's scale score should be entered in the labeled box on the student's answer booklet. The scale score is the student's final examination score. On the front of the student's answer booklet, raters must enter their initials on the lines next to "Rater 1" or "Rater 2."

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 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.

Teachers should become familiar with the Department publication *Regents Examination in Physical Setting/Physics: Rating Guide for Parts B–2 and C*. This publication can be found on the New York State Education Department web site http://www.emsc.nysed.gov/osa/scire/scirearch/phyratg02.pdf. This guide provides a set of directions, along with some examples, to assist teachers in rating parts B–2 and C of the Regents Examination in Physical Setting/Physics.

For each question requiring the student to *determine* the answer, apply the following scoring criteria:

- Allow credit if the answer is not expressed with the correct number of significant figures.
- Do not penalize a student for a rounding error or if the answer is truncated.

For each question requiring the student to *show all calculations, including the equation and substitution with units*, apply the following scoring criteria:

Scoring Criteria for Parts Calculations

- Allow 1 credit for the equation and substitution of values with units. If the equation and/or substitution with units is not shown, do *not* allow this credit. Allow credit if the student has listed the values with units and written a correct equation.
- Allow 1 credit for the correct answer (number and unit). If the number is given without the unit, allow credit if the credit for units was previously deducted for this calculation problem.
- Penalize a student only once per calculation problem for incorrect or omitted units.
- Allow credit if the answer is not expressed with the correct number of significant figures.
- Do not penalize a student for a rounding error or if the answer is truncated.

Part B–2

51 [1] Allow 1 credit for 25 m/s ± 1 m/s.

52 [1] Allow 1 credit for 39° ± 2°.

Note: Allow credit for an answer that is consistent with the student's response to question 51.

53 [2] Allow a maximum of 2 credits. Refer to *Scoring Criteria for Calculations* in this rating guide.

Examples of 2-credit responses:

$v_{ix} = v_i \cos\theta$
$v_{ix} = (40.\ \text{m/s}) \cos 39°$
$v_{ix} = 31\ \text{m/s}$

or

$v_{ix}^2 + v_{iy}^2 = v_i^2$
$v_{ix} = \sqrt{v_i^2 - v_{iy}^2}$
$v_{ix} = \sqrt{(40.\ \text{m/s})^2 - (25\ \text{m/s})^2}$
$v_{ix} = 31\ \text{m/s}$

Note: Allow credit for an answer that is consistent with the student's response to question 51 or 52.

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

— friction

— Some of the gravitational energy of the mass was converted into internal energy. Therefore, it could not return to its original height.

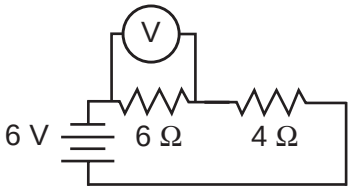
— air resistance

55 [2] Allow a maximum of 2 credits, allocated as follows:

• Allow 1 credit for drawing a series circuit containing two resistors and a battery.

• Allow 1 credit for correct placement of the voltmeter.

Example of a 2-credit response:



Note: Allow credit even if the student draws a cell instead of a battery and/or labels only one resistor with its value.

56 [2] Allow a maximum of 2 credits. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 2-credit response:

$$PE_s = \frac{1}{2}kx^2$$

$$k = \frac{2PE_s}{x^2}$$

$$k = \frac{2(1.25 \times 10^{-2}\ \text{J})}{(2.50 \times 10^{-2}\ \text{m})^2}$$

$$k = 40.0\ \text{N/m}$$

57 [1] Allow 1 credit for $6.25 \times 10^{-2}\ \Omega$.

58 [2] Allow a maximum of 2 credits. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 2-credit response:

$$R = \frac{\rho L}{A}$$

$$\rho = \frac{RA}{L}$$

$$\rho = \frac{(6.25 \times 10^{-2}\ \Omega)(3.14 \times 10^{-6}\ \text{m}^2)}{3.50\ \text{m}}$$

$$\rho = 5.61 \times 10^{-8}\ \Omega \bullet \text{m}$$

Note: Allow credit for an answer that is consistent with the student's response to question 57.

59 [1] Allow 1 credit for 6.3 m/s.

60 [2] Allow a maximum of 2 credits. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 2-credit response:

$$F_c = ma_c \qquad a_c = \frac{v^2}{r}$$

$$F_c = \frac{mv^2}{r}$$

$$F_c = \frac{(0.028\ \text{kg})(6.3\ \text{m/s})^2}{1.0\ \text{m}}$$

$$F_c = 1.1\ \text{N}$$

Note: Allow credit for an answer that is consistent with the student's response to question 59.

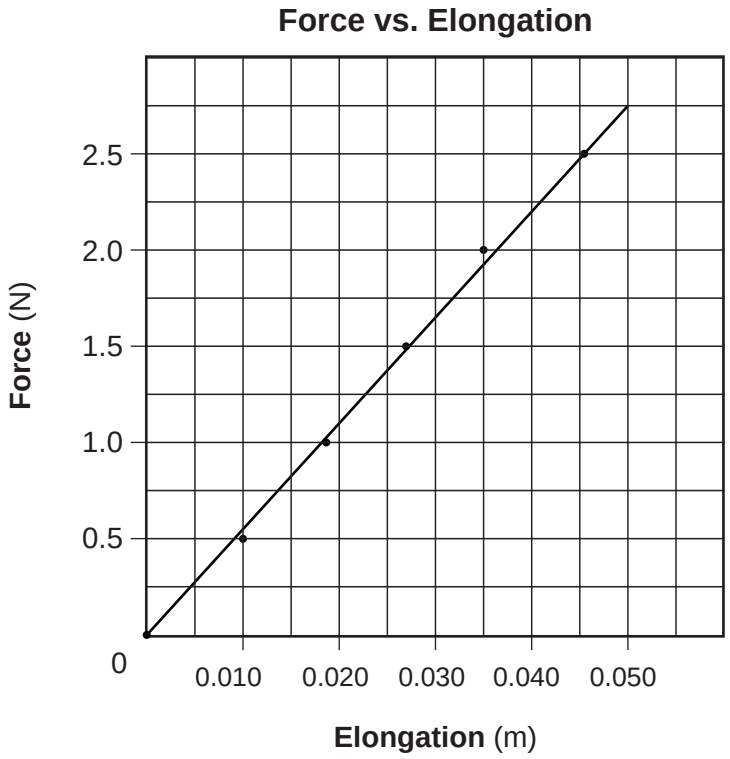
Part C

61 [1] Allow 1 credit for an appropriate linear scale.

62 [1] Allow 1 credit for plotting all points accurately ± 0.3 grid space.

63 [1] Allow 1 credit for drawing the best-fit line or curve consistent with the student's responses to questions 61 and 62.

Example of a 3-credit graph for questions 61–63:



64 [2] Allow a maximum of 2 credits. Refer to *Scoring Criteria for Calculations* in this rating guide.

Examples of 2-credit responses:

$k = \dfrac{\Delta F}{\Delta x}$ $\qquad$ $\qquad$ $\text{slope} = \dfrac{\Delta y}{\Delta x}$

$k = \dfrac{2.5\ \text{N}}{0.046\ \text{m}}$ $\qquad$ *or* $\qquad$ $\text{slope} = \dfrac{2.5\ \text{N} - 0.8\ \text{N}}{0.046\ \text{m} - 0.015\ \text{m}}$

$k = 54\ \text{N/m}$ $\qquad$ $\qquad$ $\text{slope} = 55\ \text{N/m}$

Note: Allow credit for an answer that is consistent with the student's graph.
The slope may be determined by substitution of values from the data table only if the data points are on the best-fit line *or* if the student failed to draw a best-fit line.

[6]

65 [2] Allow a maximum of 2 credits. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 2-credit response:

$a = \frac{F_{net}}{m}$

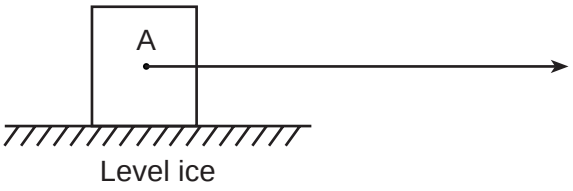
$F_{net} = ma$

$F_{net} = (20.\ \text{kg})(1.4\ \text{m/s}^2)$

$F_{net} = 28\ \text{N}$

66 [1] Allow 1 credit for a vector 5.6 cm ± 0.2 cm long parallel to the surface of the ice and pointing to the right.

Example of a 1-credit response:



Note: Allow credit for an answer that is consistent with the student's response to question 65. The vector need *not* start at point *A* to receive this credit.

67 [1] Allow 1 credit for 2.0×10^2 N *or* 196 N.

68 [2] Allow a maximum of 2 credits. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 2-credit response:

$F_f = \mu F_N$

$F_f = (0.28)(2.0 \times 10^2\ \text{N})$

$F_f = 56\ \text{N}$

Note: Allow credit for an answer that is consistent with the student's response to question 67.

69 [1] Allow 1 credit for 50.° ± 2°.

70 [2] Allow a maximum of 2 credits. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 2-credit response:

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$
$$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$$
$$\sin\theta_2 = \frac{1.00(\sin 50.^\circ)}{1.50}$$
$$\theta_2 = 31^\circ$$

Note: Allow credit for an answer that is consistent with the student's response to question 69.

71 [1] Allow 1 credit for 50.°.

Note: Allow credit for an answer that is consistent with the student's response to question 69 or 70.

72 [1] Allow 1 credit for 1.24 eV.

73 [1] Allow 1 credit for 1.98×10^{-19} J *or* an answer that is consistent with the student's response to question 72.

74 [2] Allow a maximum of 2 credits. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 2-credit response:

$$E_{photon} = hf$$
$$f = \frac{E_{photon}}{h}$$
$$f = \frac{1.98 \times 10^{-19}\ \text{J}}{6.63 \times 10^{-34}\ \text{J} \bullet \text{s}}$$
$$f = 2.99 \times 10^{14}\ \text{Hz}$$

Note: Allow credit for an answer that is consistent with the student's response to question 73.

75 [1] Allow 1 credit for infrared *or* an answer that is consistent with the student's response to question 74.

Regents Examination in Physical Setting/Physics

June 2010

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

The *Chart for Determining the Final Examination Score for the June 2010 Regents Examination in Physical Setting/Physics* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Tuesday, June 22, 2010. Conversion charts provided for previous administrations of the Regents Examination in Physical Setting/Physics must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to www.emsc.nysed.gov/osa/exameval.
2. Select the test title.
3. Complete the required demographic fields.
4. Complete each evaluation question and provide comments in the space provided.
5. Click the SUBMIT button at the bottom of the page to submit the completed form.

Map to Core Curriculum

June 2010 Physical Setting/Physics			
Question Numbers			
Key Ideas	Part A 1–35	Part B 36–60	Part C 61–75
Standard 1			
Math Key Idea 1	1, 2, 3, 4, 6, 8, 10, 11, 13, 14, 16, 17, 18, 20, 21, 23, 28, 33	37, 38, 40, 44, 45, 48, 49, 57, 58, 59, 60	61, 62, 63, 65, 66, 67, 68, 73, 74
Math Key Idea 2	9, 29	39, 46, 47, 51, 53	
Math Key Idea 3	14	41, 43, 52	61, 64, 69, 70, 71
Sci. Inq. Key Idea 1			
Sci. Inq. Key Idea 2			
Sci. Inq. Key Idea 3		42	
Eng. Des. Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2			
Standard 6			
Key Idea 1			
Key Idea 2	34		
Key Idea 3		36	
Key Idea 4			
Key Idea 5			
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
4.1	15, 16, 24	54, 55, 58, 56	
4.3	29	50, 48	70, 71
5.1		56, 42	66, 64
5.3	33		72, 75
Standard 4			
4.1	15, 16, 17, 18, 19, 20, 23	36, 37, 38, 39, 40, 41, 44, 45, 46, 54, 55, 56, 57, 58	
4.3	24, 25, 26, 27, 28, 29, 30, 35	48, 49, 50	69, 70, 71, 75
5.1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 21, 22	42, 43, 47, 51, 52, 53, 59, 60	61, 62, 63, 64, 65, 66,67, 68
5.3	31, 32, 33, 34		72, 73, 74