FOR TEACHERS ONLY

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

PHYSICAL SETTING/PHYSICS

Tuesday, June 25, 2024 — 9:15 a.m. to 12:15 p.m., only

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: https://www.nysed.gov/state-assessment/high-school-regents-examinations 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.

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Regents Examination in Physical Setting/Physics. Additional information about scoring is provided in the publication *Information Booklet or Scoring Regents Examinations in the Sciences*.

Allow 1 credit for a correct response to each item.

At least two science teachers must participate in the scoring of each student's responses to the Part B–2 and Part C 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. Teachers may not score their own students' answer papers.

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. Do not attempt to correct the student's work by making insertions or changes of any kind. 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 to be given when the wording of the question allows such omissions.

For hand scoring, 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 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 at: https://www.nysed.gov/state-assessment/high-school-regents-examinations on Tuesday, June 25, 2024. The student's scale score should be entered in the box labeled "Scale Score"on the student's answer booklet. The scale score is the student's final examination score.

Schools are not 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 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.

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's web site https://www.nysed.gov/common/nysed/files/programs/state-assessment/physics-rating-guide.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.

Scoring Criteria for Calculations

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

- 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.

Part B–2

51 [1] Allow 1 credit for the equation and substitution with units. Refer to *Scoring Criteria for Calculations* in this rating guide.

Examples of 1-credit responses:

$$g = \frac{F_g}{m} \qquad g = \frac{7.15\ \text{N}}{5.00\ \text{kg}}$$

or

$$g = \frac{F_g}{m} = \frac{\frac{Gm_1m_2}{r^2}}{m} = \frac{Gm_1}{r^2} \qquad g = \frac{(6.67 \times 10^{-11}\ \text{N}\bullet\text{m}^2/\text{kg}^2)(6.50 \times 10^{23}\ \text{kg})}{(5.50 \times 10^6\ \text{m})^2}$$

52 [1] Allow 1 credit for the correct answer with units *or* for an answer, with units, that is consistent with the student's response to question 51.

Examples of 1-credit responses:

$g = 1.43\ \text{N/kg}$ *or* $g = 1.43\ \text{m/s}^2$

Note: Do *not* penalize the student more than 1 credit for errors in units in questions 51 and 52.

53 [1] Allow 1 credit for the equation and substitution with units. Refer to *Scoring Criteria for Calculations* in this rating guide.

Examples of 1-credit responses:

$$\bar{v} = \frac{d}{t} \qquad t = \frac{d}{\bar{v}} \qquad t = \frac{5.0\ \text{m}}{2.5\ \text{m/s}}$$

or

$$v_f = v_i + at \qquad t = \frac{v_f - v_i}{a} \qquad t = \frac{4.0\ \text{m/s} - 1.0\ \text{m/s}}{1.5\ \text{m/s}^2}$$

54 [1] Allow 1 credit for the correct answer with units *or* for an answer, with units, that is consistent with the student's response to question 53.

Example of a 1-credit response:

$t = 2.0\ \text{s}$

Note: Do *not* penalize the student more than 1 credit for errors in units in questions 53 and 54.

55 [1] Allow 1 credit for the equation and substitution with units. Refer to *Scoring Criteria for Calculations* in this rating guide.

Examples of 1-credit responses:

$P = \frac{V^2}{R}$

$R = \frac{V^2}{P}$

$R = \frac{(12\text{ V})^2}{20.\text{ W}}$

or

$R = \frac{V}{I}$

$R = \frac{12\text{ V}}{1.7\text{ A}}$

56 [1] Allow 1 credit for the correct answer with units *or* for an answer, with units, that is consistent with this student's response to question 55.

Examples of 1-credit responses:

$R = 7.2\ \Omega$ *or* $7.1\ \Omega$

Note: Do *not* penalize the student more than 1 credit for errors in units in questions 55 and 56.

57 [1] Allow 1 credit for 7.0 m/s.

58 [1] Allow 1 credit for the equation and substitution with units. Refer to *Scoring Criteria for Calculations* in this rating guide.

Examples of 1-credit responses:

$a = \frac{\Delta v}{t}$

$a = \frac{10.0\text{ m/s} - 4.0\text{ m/s}}{8.0\text{ s}}$

or

$a = slope$

$slope = \frac{\Delta y}{\Delta x}$

$a = \frac{3.0\text{ m/s}}{4.0\text{ s}}$

59 [1] Allow 1 credit for the correct answer with units *or* for an answer, with units, that is consistent with the student's response to question 58.

Example of a 1-credit response:

$a = 0.75\text{ m/s}^2$

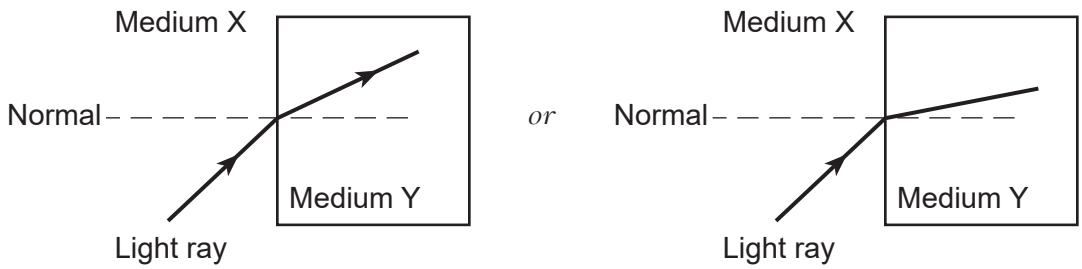
Note: Do *not* penalize the student more than 1 credit for errors in units in questions 58 and 59.

60 [1] Allow 1 credit for 1.71.

Note: Do *not* allow credit for an answer which includes a unit.

61 [1] Allow 1 credit for using a straightedge to draw a refracted ray that is closer to the normal than the original ray was.

Examples of 1-credit responses:



62 [1] Allow 1 credit for the equation and substitution with units. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 1-credit response:

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

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

$$L = \frac{(1.21 \times 10^{-2}\,\Omega)\,(5.03 \times 10^{-7}\,\mathrm{m}^2)}{5.60 \times 10^{-8}\,\Omega\bullet\mathrm{m}}$$

63 [1] Allow 1 credit for the correct answer with units *or* for an answer, with units, that is consistent with the student's response to question 62.

Example of a 1-credit response:

$L = 1.09 \times 10^{-1}\,\mathrm{m}$

Note: Do *not* penalize the student more than 1 credit for errors in units in questions 62 and 63.

64 [1] Allow 1 credit for the equation and substitution with units. Refer to *Scoring Criteria for Calculations* in this rating guide.

Examples of 1-credit responses:

$F_s = kx$
$F_s = (250.\ \mathrm{N/m})(0.300\ \mathrm{m})$

or

$F_s = kx$
$F_s = (250.\ \mathrm{N/m})(0.500\ \mathrm{m} - 0.200\ \mathrm{m})$

65 [1] Allow 1 credit for the correct answer with units *or* for an answer, with units, that is consistent with the student's response to question 64.

Example of a 1-credit response:

$F_s = 75.0$ N

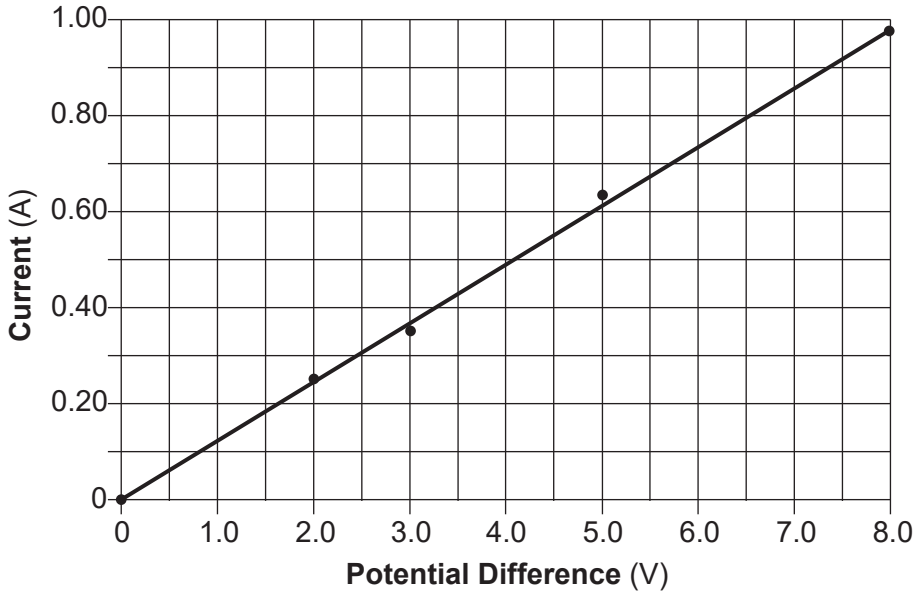
Note: Do *not* penalize the student more than 1 credit for errors in units in questions 64 and 65.

Part C

66 [1] Allow 1 credit for all five data points plotted correctly (± 0.3 grid space).

67 [1] Allow 1 credit for drawing a line of best fit.

Example of a 2-credit graph for questions 66 and 67:



68 [1] Allow 1 credit for the equation and substitution with units consistent with the student's response to question 67. Refer to *Scoring Criteria for Calculations* in this rating guide.

Examples of 1-credit responses:

$$slope = \frac{\Delta y}{\Delta x} \qquad \textit{or} \qquad slope = \frac{\Delta y}{\Delta x}$$

$$slope = \frac{0.80\ \text{A} - 0.24\ \text{A}}{6.5\ \text{V} - 2.0\ \text{V}} \qquad slope = \frac{0.98\ \text{A}}{8.0\ \text{V}}$$

69 [1] Allow 1 credit for the correct answer with units *or* for an answer, with units, that is consistent with the student's response to question 68.

Example of a 1-credit response:

$$slope = 0.12\ \frac{\text{A}}{\text{V}}$$

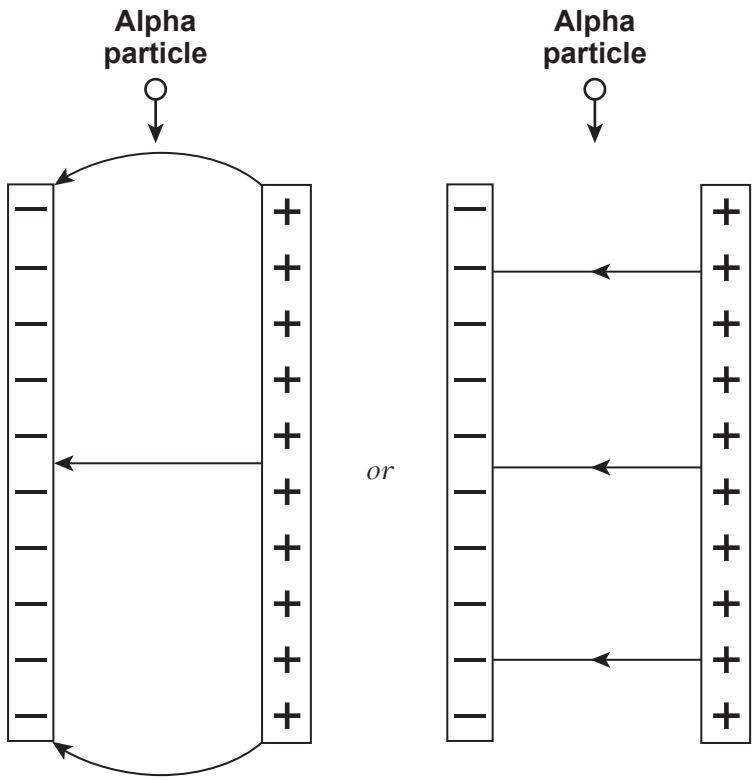
Note: Do *not* penalize the student more than 1 credit for errors in units in questions 68 and 69.

70 [1] Allow 1 credit for 8.2 Ω *or* 8.3 Ω *or* for an answer that is consistent with the student's response to question 69.

71 [1] Allow 1 credit for 3.20×10^{-19} C.

72 [1] Allow 1 credit for *at least three* arrows pointing away from the positive plate toward the negative plate.

Examples of 1-credit responses:



Note: The use of a straightedge is not necessary to draw the field lines. Field lines near the edge of the plates may be curved. The field lines do not need to touch the plates or be equidistant to receive this credit.

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

— The electrostatic force is toward the negative plate.

— away from the positive plate

— to the left

74 [1] Allow 1 credit for the equation and substitution with units *or* for an answer, with units, that is consistent with the student's response to question 71. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 1-credit response:

$$E = \frac{F_e}{q}$$

$$F_e = qE$$

$$F_e = (3.20 \times 10^{-19}\,\text{C})(5.0 \times 10^{4}\,\text{N/C})$$

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

Example of a 1-credit response:

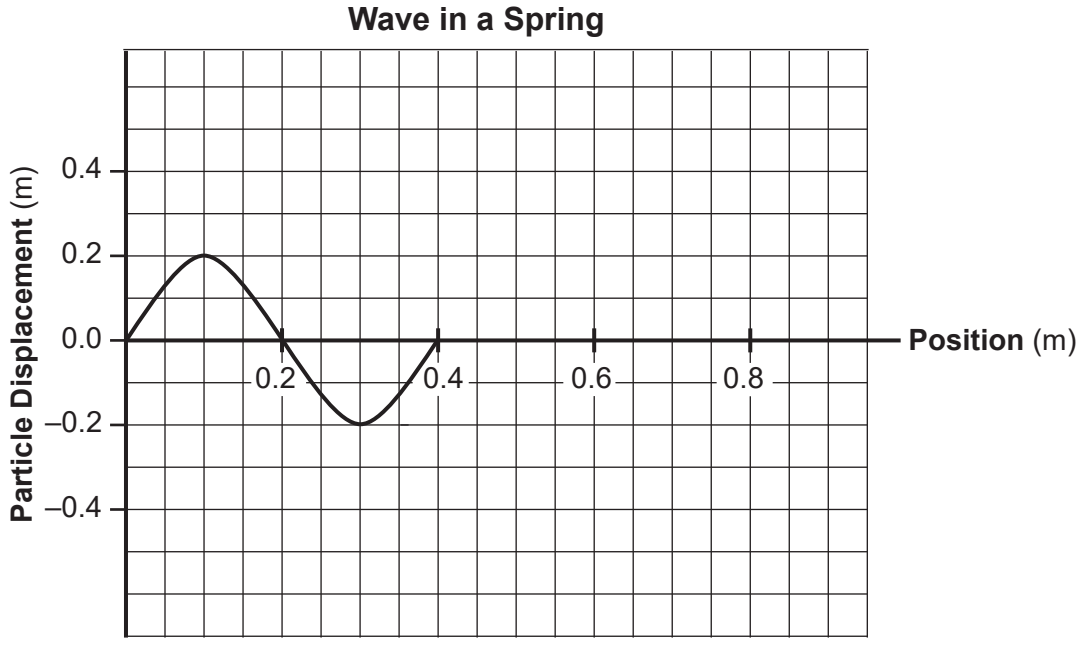
$$F_e = 1.6 \times 10^{-14}\,\text{N}$$

Note: Do *not* penalize the student more than 1 credit for errors in units in questions 74 and 75.

76 [1] Allow 1 credit for one complete wave with a wavelength of 0.40 m.

77 [1] Allow 1 credit for an amplitude of 0.20 m.

Example of a 2-credit response for questions 76 and 77:



Note: The wave does not need to start at 0.0 *or* be a sine curve to receive this credit.

78 [1] Allow 1 credit for 3.0 Hz.

79 [1] Allow 1 credit for the equation and substitution with units *or* for an answer, with units, that is consistent with the student's responses to questions 76 and 78. Refer to *Scoring Criteria for Calculations* in this rating guide.

Examples of 1-credit responses:

$v = f\lambda$
$v = (3.0\text{ Hz})(0.40\text{ m})$
$v = 1.2\text{ m/s}$

or

$\bar{v} = \frac{d}{t}$
$\bar{v} = \frac{0.40\text{ m}}{0.33\text{ s}}$

80 [1] Allow 1 credit for the correct answer with units *or* for an answer, with units, that is consistent with the student's response to question 79.

Examples of 1-credit responses:

$v = 1.2\text{ m/s}$ *or* $\bar{v} = 1.2\text{ m/s}$

Note: Do *not* penalize the student more than 1 credit for errors in units in questions 79 and 80.

81 [1] Allow 1 credit for 5.1×10^{-29} kg.

82 [1] Allow 1 credit for the equation and substitution with units *or* for an answer, with units, that is consistent with the student's response to question 81. Refer to *Scoring Criteria for Calculations* in this rating guide.

Example of a 1-credit response:

$E = mc^2$

$E = (5.1 \times 10^{-29}\,\text{kg})(3.00 \times 10^{8}\,\text{m/s})^2$

83 [1] Allow 1 credit for the correct answer with units *or* for an answer, with units, that is consistent with the student's response to question 82.

Example of a 1-credit response:

$E = 4.6 \times 10^{-12}\,\text{J}$

Note: Do *not* penalize the student more than 1 credit for errors in units in questions 82 and 83.

84 [1] Allow 1 credit for 29 MeV *or* 28 MeV *or* for an answer that is consistent with the student's response to question 83.

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

— strong nuclear force

— strong force

— strong

Note: Do *not* allow credit for nuclear force, only.

Regents Examination in Physical Setting/Physics

June 2024

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

The *Chart for Determining the Final Examination Score for the June 2024 Regents Examination in Physical Setting/Physics* will be posted on the Department's web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations on Tuesday, June 25, 2024. 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 https://www.nysed.gov/state-assessment/teacher-feedback-state-assessments.

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 2024 Physical Setting/Physics			
Question Numbers			
Key Ideas	Part A	Part B	Part C
Standard 1			
Math Key Idea 1	2, 3, 8, 10, 11, 12, 13, 14, 15, 18, 25, 26, 28,	36, 37, 38, 45, 48, 50, 51, 52, 53, 54, 55, 56, 62, 63, 64, 65	66, 67, 71, 74, 75, 78, 79, 80, 81, 82, 83, 84
Math Key Idea 2		39, 47, 57, 58, 59	68, 69
Math Key Idea 3	29		70
Science Inquiry Key Idea 1			85
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3	27	41, 46	
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2			
Standard 6			
Key Idea 1	22		
Key Idea 2	24, 25		72, 73
Key Idea 3	15, 18	36, 62, 63	81, 82, 83, 84
Key Idea 4	6	40, 49	
Key Idea 5	8, 12, 29		
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
4.1	22, 23, 24		82, 83, 84
4.3	21	42, 43, 61	76, 77
5.1	2, 11	45, 47, 48, 49, 50, 57, 58, 59	
5.3		44	
Standard 4			
4.1	12, 15, 17, 18, 20, 22, 24, 25, 33	37, 38, 39, 50, 55, 56, 62, 63	66, 67, 68, 69, 70, 74, 75
4.3	7, 16, 21, 31, 32, 35	36, 42, 43, 60, 61	76, 77, 78, 79, 80
5.1	1, 2, 3, 4, 5, 6, 8, 10, 11, 13, 14, 19, 23, 26, 28, 29, 30, 34	40, 45, 46, 47, 48, 49, 51, 52, 53, 54, 57, 58, 59, 64, 65	72, 73
5.3	9, 27	41, 44	71, 81, 82, 83, 84, 85