

FOR TEACHERS ONLY

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

PHYSICAL SETTING/CHEMISTRY

Thursday, August 17, 2023 — 8:30 to 11:30 a.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/Chemistry. Additional information about scoring is provided in the publication *Information Booklet for Scoring Regents Examinations in the Sciences*.

At least two science teachers must participate in the scoring of 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 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 be given when the wording of the questions 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 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 Thursday, August 17, 2023. The student’s scale score should be entered in the box labeled “Scale Score” on the student’s answer sheet. The scale score is the student’s final examination score.

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.

Part B–2

Allow a total of 15 credits for this part. The student must answer all questions in this part.

51 [1] Allow 1 credit for 6 *or* six.

52 [1] Allow 1 credit for 17 *or* seventeen.

53 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Metals conduct electricity better than halogens.

A halogen is a poor conductor compared to an alkali metal.

The metal is better.

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

ionic bonds

ionic

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

All halogen atoms have 7 valence electrons in the ground state.

They have atoms with the same number of outermost shell electrons.

They each need one more electron to achieve a stable octet.

56 [1] Allow 1 credit for $\underline{3}$ Ag₂S + $\underline{2}$ Al → $\underline{6}$ Ag + $\underline{\quad}$ Al₂S₃.

Allow 1 credit even if the coefficient “1” is written in front of Al₂S₃.

57 [1] Allow 1 credit for 150. g/mol *or* for any value from 149.96 g/mol to 150.3 g/mol, inclusive.

58 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

$$\text{moles} = \frac{546 \text{ g}}{248 \text{ g/mol}}$$

$$546 \text{ g} \times \frac{1 \text{ mol}}{248 \text{ g}}$$

$$\frac{1}{248} = \frac{x}{546}$$

$$\frac{546}{248}$$

59 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The equation shows energy on the reactant side.

Energy is on the left side of the equation.

The 53 kJ is on the left side.

heat term on reactant side

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

At equilibrium, the forward reaction rate equals the reverse reaction rate, so equal numbers of HI molecules are produced and broken down.

The rate of formation of HI equals the rate at which HI is decomposed.

The rates are equal.

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

An increase in temperature will increase the concentration of HI(g).

The concentration of HI(g) increases.

HI increases.

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

Butane has only single carbon-carbon bonds.

There are no multiple bonds between the carbon atoms.

no C=C or C≡C bonds; just C–C bonds

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

halide

halocarbon

alkyl halide

halogenoalkanes

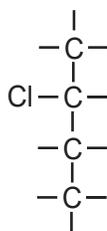
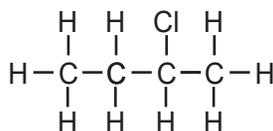
64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The intermolecular forces in 1-chlorobutane are stronger than the intermolecular forces in 2-chlorobutane.

weaker in 2-chlorobutane

65 [1] Allow 1 credit.

Examples of 1-credit responses:



Note: Do *not* allow credit if only some of the H atoms bonded to C atoms are shown.

Part C

Allow a total of 20 credits for this part. The student must answer all questions in this part.

66 [1] Allow 1 credit for 3 *or* three.

67 [1] Allow 1 credit for 34.0% *or* 34%.

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

$$\frac{37.0\% - 36.1\%}{36.1\%} \times 100 =$$

$$\frac{37.0 - 36.1}{36.1} \times 100 =$$

$$\frac{0.9\%}{36.1\%} \times 100 =$$

$$\frac{90}{36.1}$$

Note: Do *not* allow credit if the fraction is not multiplied by 100.

69 [1] Allow 1 credit for 2 *or* two *or* 1 pair.

70 [1] Allow 1 credit for Ne *or* neon.

71 [1] Allow 1 credit for 109 kJ.

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

The density of the helium is less at 50.0 mL.

The He is more dense at 25.0 mL.

less dense at 50 mL

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

Temperature: higher

Pressure: lower

Temperature: any temperature above 296 K

Pressure: any pressure lower than 1.3 atm

74 [1] Allow 1 credit for any value from 0.11 mol to 0.13 mol, inclusive.

75 [1] Allow 1 credit for sodium nitrate.

76 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The sample 1 solution has a higher boiling point than water, when both are at standard pressure.

Water has a lower boiling point than the solution.

The BP of $\text{NaNO}_3(\text{aq})$ is higher.

lower for water

77 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The Cu^{2+} ions are attracted to the bracelet.

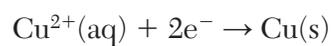
bracelet

negative electrode

cathode

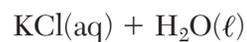
78 [1] Allow 1 credit for +6 or 6+.

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



Note: Do *not* allow credit for the e without the minus sign (-).

80 [1] Allow 1 credit. Acceptable responses include, but are not limited to:



81 [1] Allow 1 credit for 2.1.

82 [1] Allow 1 credit for 0.080 M or 0.08 M.

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

alpha decay

alpha

α

${}^4_2\text{He}$

${}^4_2\alpha$

alpha particle

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

${}^{141}_{57}\text{La}$

${}^{141}\text{La}$

La-141

lanthanum-141

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

The fission of one mole of U-235 releases much more energy than the combustion of one mole of C_8H_{18} .

For equal quantities, fission gives out more energy than combustion.

Burning 1 mol of C_8H_{18} releases much less energy.

less energy from chemical reaction

Regents Examination in Physical Setting/Chemistry

August 2023

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

The *Chart for Determining the Final Examination Score for the August 2023 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site at: <https://www.nysed.gov/state-assessment/high-school-regents-examinations> on Thursday, August 17, 2023. Conversion charts provided for previous administrations of the Regents Examination in Physical Setting/Chemistry 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.surveymonkey.com/r/8LNLLDW>.
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 2023 Physical Setting/Chemistry			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		32, 38, 58	66, 68, 74
Math Key Idea 2		43, 54	79
Math Key Idea 3		36, 41, 52, 56, 57	67, 71, 78, 82
Science Inquiry Key Idea 1		33, 34, 40, 42, 44, 46, 47, 48, 49, 51, 54, 60, 61, 62, 63, 64	69, 70, 72, 73, 76, 83, 85
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3		31, 34, 40, 42, 46, 47, 48, 49, 50, 56, 59, 64	69, 70, 71, 73, 75, 77, 78, 79, 80, 84
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2		50	
Key Idea 3			
Standard 6			
Key Idea 1			
Key Idea 2		65	68
Key Idea 3			81
Key Idea 4			
Key Idea 5			
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		31, 32, 33, 35, 36, 39, 45, 47, 49, 51, 52, 53, 55, 56, 57, 58, 60, 61, 63, 65	77, 79, 80, 82
Key Idea 4		41, 43, 59	84
Key idea 5		37	70
Standard 4			
Key Idea 3	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27, 29, 30	31, 32, 33, 34, 35, 36, 39, 40, 42, 44, 45, 46, 47, 48, 49, 51, 52, 53, 55, 56, 57, 58, 60, 61, 62, 63, 65	66, 67, 68, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82
Key Idea 4	21	41, 43, 50, 59	83, 84
Key Idea 5	9, 12, 13, 20, 28	37, 38, 54, 64	69, 70, 71, 85
Reference Tables			
2011 Edition	3, 4, 5, 6, 7, 13, 14, 16, 24, 25, 27, 30	31, 34, 35, 37, 38, 40, 41, 42, 44, 47, 49, 50, 51, 52, 55, 57, 58, 59, 62, 63, 65	67, 68, 70, 71, 72, 75, 78, 82, 83, 84, 85