FOR TEACHERS ONLY

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

PHYSICAL SETTING/CHEMISTRY

Tuesday, January 21, 2025 — 1:15 to 4:15 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/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 Tuesday, January 21, 2025. 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. Acceptable responses include, but are not limited to:

Electrons in the excited boron atoms release energy as the electrons move from higher energy states to lower energy states.

The boron electrons lose energy as they return to lower energy states.

Excited electrons emit light when they return to lower electron shells.

Excited electrons move to lower energy states.

52 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

$(62.93\text{ u})(0.6915) + (64.93\text{ u})(0.3085)$

$$\frac{(62.93)(69.15) + (64.93)(30.85)}{100}$$

$(30.85\%)(64.93) + (69.15\%)(62.93)$

Note: Do *not* allow credit for a numerical setup using mass numbers rather than isotopic masses.

53 [1] Allow 1 credit for 2.0% *or* for any value from 2% to 2.01%, inclusive.

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

metal

metals

alkaline earth metals

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

A calcium atom has one more electron shell than a magnesium atom.

The Ca atoms have 4 shells of electrons while the Mg atoms have only 3 shells of electrons.

Calcium atoms have more electron shells.

56 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

From Be through Ba for the Group 2 elements, the first ionization energy decreases.

The ionization energies decrease going down Group 2.

As atomic number increases, first ionization energy decreases.

decreases

57 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The average kinetic energy of the gas molecules in diagram 1 is equal to the average kinetic energy of the gas molecules in diagram 2.

The average KE of the molecules in the two gases is the same.

equal

same

58 [1] Allow 1 credit for 0.97 L *or* any value from 0.970 L to 0.983 L, inclusive.

59 [1] Allow 1 credit for 0.592 atm *or* any value from 0.59 atm to 0.6 atm, inclusive.

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

The potential energy of the molecules is less before vaporization.

The PE is less before vaporization.

greater after vaporization

61 [1] Allow 1 credit for 6350 J.

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

This molecular compound has weaker intermolecular forces than water, which causes the compound to boil at 80.°C while water boils at 100.°C.

Water has stronger intermolecular forces than the molecular compound, which causes the boiling point of water to be higher.

This molecular compound has weaker IMFs.

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

hydronium ion	H_3O^+
hydronium	H^+
hydrogen ion	$H_3O^+(aq)$
hydrogen	$H^+(aq)$

Note: Do *not* allow credit for H *or* H_2.

64 [1] Allow 1 credit for red.

65 [1] Allow 1 credit for 0.020 M *or* 0.02 M *or* .02 M.

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. Acceptable responses include, but are not limited to:

ionic bonding and covalent bonding

polar covalent and ionic

ionic and covalent

67 [1] Allow 1 credit for Ne *or* neon.

68 [1] Allow 1 credit for 1.7.

69 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Water has a higher freezing point.

The freezing point of the KNO_3 solution is lower than the freezing point of water.

The freezing point of $KNO_3(aq)$ is less.

The solution has a lower freezing point.

70 [1] Allow 1 credit for unsaturated *or* not saturated.

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

Gently heat the solution to evaporate the water until only solid KNO_3 remains.

Boil off the water.

Allow the water to evaporate.

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

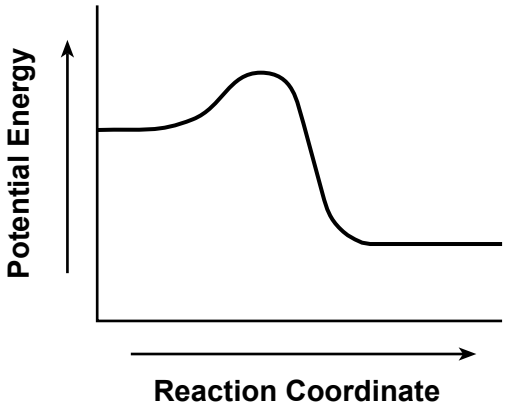
Two reactants form only one product.

Two substances react to form one substance.

Two compounds form one compound.

73 [1] Allow 1 credit for showing that the PE of the products is lower than the PE of the reactants.

Example of a 1-credit response:



74 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The rate of the forward reaction equals the rate of the reverse reaction.

Both reactions occur at the same rate.

The rates are the same.

equal

same

75 [1] Allow 1 credit for 14.

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

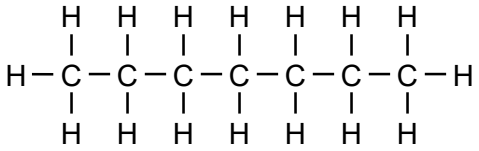
All of the carbon-carbon bonds in octane are single bonds.

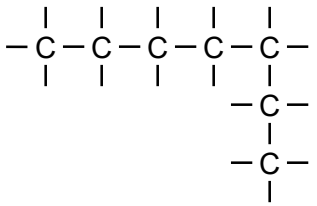
There are no multiple C to C bonds in octane.

There are no C=C or C≡C bonds.

77 [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.

78 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Electrolytic cells require electrical energy.

The power source causes the nonspontaneous reaction to occur.

Reactions that are not spontaneous require energy from an outside source.

79 [1] Allow 1 credit for 4.0 mol *or* 4 mol.

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

From –1 to 0

From 1– to 0

81 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

for any value from 0.70×10^5 y to 0.80×10^5 y, inclusive

for any value from 7.0×10^4 y to 8.0×10^4 y, inclusive

for any value from 70 000 y to 80 000 y, inclusive

82 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

$\frac{1}{4}$

0.25

25%

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

The penetrating power of a beta particle is greater than that of an alpha particle from Th-230.

An alpha particle has less penetrating ability than a beta particle.

The β^- has a stronger penetrating power.

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

$^{234}_{90}Th$

Th-234

thorium-234

^{234}Th

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

An atom of uranium is changing to an atom of thorium.

A different element is being formed.

An isotope of U becomes an isotope of Th.

Uranium has atomic number 92 and thorium has atomic number 90.

The *Chart for Determining the Final Examination Score for the January 2025 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 Tuesday, January 21, 2025. 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.nysed.gov/state-assessment/teacher-feedback-state-assessments.
2. Click Regents Examinations.
3. Complete the required demographic fields.
4. Select the test title from the Regents Examination dropdown list.
5. Complete each evaluation question and provide comments in the space provided.
6. Click the SUBMIT button at the bottom of the page to submit the completed form.

Map to Core Curriculum

January 2025 Physical Setting/Chemistry			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		39, 42, 52, 53, 59	
Math Key Idea 2		60	81, 84
Math Key Idea 3		31, 35, 36, 42, 53, 58, 59, 61	68, 75, 80, 82
Science Inquiry Key Idea 1		33, 34, 37, 38, 39, 41, 43, 44, 45, 46, 47, 48, 49, 50, 51, 56, 57, 60, 62, 63, 64, 65	66, 67, 69, 70, 71, 72, 74, 75, 76, 78, 79, 83, 85
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3		32, 33, 35, 37, 38, 41, 42, 43, 44, 45, 46, 47, 48, 53, 56, 62	71, 72, 73, 79, 80, 84, 85
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1		54, 55	
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1		40	
Key Idea 2		38	73
Key Idea 3		49	
Key Idea 4			
Key Idea 5			81
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		31, 32, 33, 34, 38, 43, 46, 52, 54, 55, 56, 58, 63, 64, 65	69, 70, 72, 74,77, 78
Key Idea 4		60, 61	73, 81, 82, 84
Key idea 5		62	67
Standard 4			
Key Idea 3	1, 2, 3, 4, 5, 7, 12, 13, 14, 15, 16, 18, 20, 21, 22, 23, 24, 26, 27, 28	31, 32, 33, 34, 35, 36, 38, 39, 41, 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 58, 59, 63, 64, 65	69, 70, 71, 72, 74, 75, 76, 77, 78, 79, 80, 83
Key Idea 4	17, 19, 29	40, 42, 50, 57, 60, 61	73, 81, 82, 84
Key Idea 5	6, 8, 9, 10, 11, 25, 30	37, 62	66, 67, 68, 85
Reference Tables			
2011 Edition	7, 11, 17, 23, 24, 25	31, 33, 34, 35, 36, 42, 46, 47, 53, 54, 55, 56, 58, 59, 61, 63, 64, 65	66, 67, 68, 70, 75, 76, 77, 83, 84