

FOR TEACHERS ONLY

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

P.S.—CH PHYSICAL SETTING/CHEMISTRY

Friday, January 25, 2019 — 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 at: <http://www.p12.nysed.gov/assessment/> 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.

Part A and Part B-1

Allow 1 credit for each correct response.

Part A			
1 2	9 1	17 4	25 4
2 2	10 2	18 2	26 2
3 2	11 3	19 2	27 3
4 1	12 4	20 4	28 3
5 1	13 2	21 2	29 2
6 1	14 1	22 1	30 3
7 2	15 1	23 1	
8 1	16 4	24 4	
Part B-1			
31 4	36 2	41 1	46 1
32 1	37 3	42 3	47 3
33 4	38 4	43 3	48 4
34 1	39 3	44 2	49 1
35 4	40 3	45 2	50 1

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*.

Do not attempt to correct the student's work by making insertions or changes of any kind. If the student's responses for the multiple-choice questions are being hand scored prior to being scanned, the scorer must be careful not to make any marks on the answer sheet except to record the scores in the designated score boxes. Marks elsewhere on the answer sheet will interfere with the accuracy of the scanning.

Allow 1 credit for each correct response.

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 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. 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: <http://www.p12.nysed.gov/assessment/> on Friday, January 25, 2019. 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 Kr *or* krypton.

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

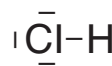
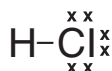
A cesium atom loses its valence electron, making the cesium ion smaller.

The cesium atom has one more electron shell than the cesium ion.

A Cs⁺ ion has only 5 shells of electrons in the ground state and the Cs atom has 6 shells.

53 [1] Allow 1 credit.

Examples of 1-credit responses:



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

The molecule is nonpolar because it has a symmetrical charge distribution.

The center of positive and negative charges coincide.

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

positron decay

β^+

${}^0_{+1}\text{e}$

${}^0_{+1}\beta$

positron

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

Ne-20: 10

Ne-22: 12

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

$$(19.99 \text{ u})(0.9048) + (20.99 \text{ u})(0.0027) + (21.99 \text{ u})(0.0925)$$

$$\frac{(19.99)(90.48) + (20.99)(0.27) + (21.99)(9.25)}{100}$$

$$(19.99)(90.48\%) + (20.99)(0.27\%) + (21.99)(9.25\%)$$

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

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

Na, Mg, Al

aluminum, sodium, magnesium

59 [1] Allow 1 credit for Na *or* sodium.

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

As the atomic number of the elements in Period 3 increases, the atomic radius generally decreases.

The radius gets smaller.

61 [1] Allow 1 credit for 2 *or* two *or* 1 pair.

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

H–I bond: polar

S–S bond: nonpolar

H–I bond: polar covalent

S–S bond: nonpolar covalent

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

Sulfur and oxygen atoms both have 6 valence electrons.

Atoms of both elements need the same number of electrons to complete their outer shells.

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

voltaic cell

voltaic

Galvanic

65 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The concentration of the Cu^{2+} ions decreases.

There are fewer copper ions in the solution.

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:

The NaCl(s) dissolves in H₂O(ℓ), but sand does not dissolve.

The sand is insoluble in water.

After the stirring, the sand settles to the bottom of the flask.

67 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

According to Table G, the salt solution is unsaturated.

The 3.0 g of salt dissolved in 50. g of H₂O has a concentration less than the solubility of NaCl on Table G at 20.°C.

Table G indicates that the solubility of NaCl is greater than the amount in the sample.

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

Allow the water to evaporate.

Heat the mixture until all of the water vaporizes.

Boil off the water.

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

$$\frac{3.4 \text{ g} - 3.0 \text{ g}}{3.0 \text{ g}} \times 100$$

$$\frac{(0.4)(100)}{3}$$

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

70 [1] Allow 1 credit for any value from 334 K to 341 K, inclusive.

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

Unlike ideal gas particles, He particles have volume.

Each atom of helium occupies space.

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

When the temperature increases, the distance between He atoms increases.

As the helium is heated, the He atoms move farther apart.

The average distance increases.

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

lower the pressure

decrease pressure

any pressure below 100. kPa

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

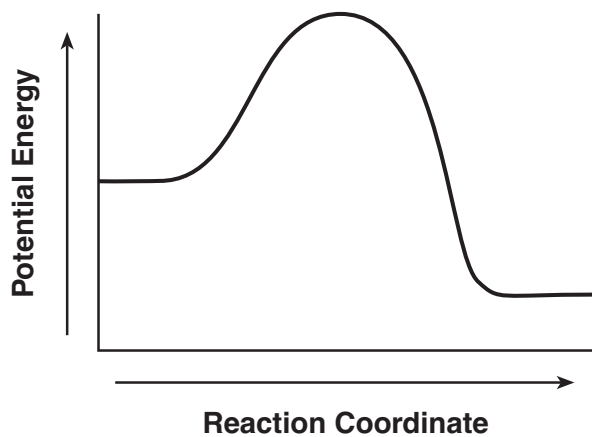
Increase the surface area of the zinc.

Increase the temperature of the reaction.

Use a more concentrated HCl(aq) solution.

75 [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:



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

The $\text{H}_2(\text{g})$ can leave the open test tube.

The reaction is driven to completion because a gas is released.

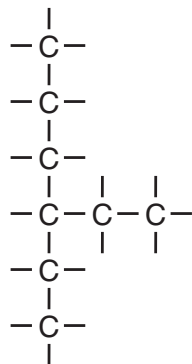
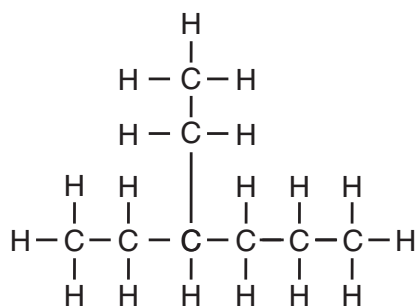
Reaction not reversible.

77 [1] Allow 1 credit for 10 *or* ten.

78 [1] Allow 1 credit for 40°C to 200°C . Significant figures do *not* need to be shown.

79 [1] Allow 1 credit.

Examples of 1-credit responses:



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

hydronium ion	H_3O^+
hydronium	H^+
hydrogen ion	$\text{H}_3\text{O}^+(\text{aq})$
hydrogen	$\text{H}^+(\text{aq})$
proton	

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

$$M_A(20.0 \text{ mL}) = (0.025 \text{ M})(17.6 \text{ mL})$$
$$\frac{(.025)(17.6)}{20}$$

82 [1] Allow 1 credit for 2 *or* two.

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

Paint with Ra-226 will glow for a longer time than paint containing the other isotopes because Ra-226 has the longest half-life of these isotopes.

The other isotopes have shorter half-lives, so paint containing them will not glow for as many years.

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

${}^{147}_{62}\text{Sm}$
Sm-147
 ${}^{147}\text{Sm}$
samarium-147

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

$\frac{1}{8}$
0.125
12.5%

Regents Examination in Physical Setting/Chemistry

January 2019

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

The *Chart for Determining the Final Examination Score for the January 2019 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> on Friday, January 25, 2019. 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 <http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm>.
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

January 2019 Physical Setting/Chemistry			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		36, 37, 38, 41, 57	67, 69, 70, 81, 82
Math Key Idea 2			72
Math Key Idea 3		35, 36, 40, 46, 47, 56	77, 84, 85
Science Inquiry Key Idea 1		31, 50, 51, 52, 54, 55, 58, 60, 61, 62, 63, 64	66, 68, 71, 72, 73, 74, 76, 78, 80, 83
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3		31, 32, 33, 34, 39, 43, 44, 45, 47, 48, 49, 59, 61, 65	75, 76, 78
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1			
Key Idea 2			75, 79
Key Idea 3		48	
Key Idea 4			
Key Idea 5			
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		33, 35, 36, 38, 40, 42, 44, 56, 57, 58, 59, 60, 63, 64	67, 68, 71, 72, 79, 81
Key Idea 4		41, 49	75, 84, 85
Key idea 5		32, 51, 53, 62	
Standard 4			
Key Idea 3	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28	31, 33, 34, 35, 36, 37, 38, 39, 40, 42, 43, 44, 45, 46, 47, 48, 50, 56, 57, 58, 59, 60, 63, 64, 65	66, 67, 68, 69, 70, 71, 72, 73, 74, 76, 77, 78, 79, 80, 81, 82
Key Idea 4	16, 17, 19, 30	41, 49, 55	75, 83, 84, 85
Key Idea 5	12, 13, 29	32, 51, 52, 53, 54, 61, 62	
Reference Tables			
2011 Edition	2, 3, 5, 6, 7, 8, 14, 18, 24, 25, 26	31, 34, 36, 37, 38, 40, 41, 43, 47, 51, 52, 53, 54, 55, 56, 58, 59, 60, 62, 63	67, 69, 77, 78, 79, 80, 81, 83, 84