

FOR TEACHERS ONLY

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

P.S.–CH PHYSICAL SETTING/CHEMISTRY

Wednesday, August 16, 2017 — 8:30 to 11:30 a.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 3	9 3	17 4	25 3
2 2	10 1	18 1	26 1
3 2	11 3	19 1	27 4
4 4	12 4	20 4	28 2
5 1	13 1	21 2	29 3
6 4	14 4	22 2	30 1
7 4	15 4	23 2	
8 1	16 3	24 1	
Part B–1			
31 4	36 4	41 1	46 2
32 3	37 2	42 2	47 4
33 4	38 2	43 4	48 1
34 1	39 2	44 2	49 3
35 1	40 3	45 1	50 3

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 Wednesday, August 16, 2017. 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:

polar covalent bond

covalent

polar covalent

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

The butanamide molecule has an asymmetrical distribution of charge.

The molecule has an unequal charge distribution.

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

The rate of the forward reaction is equal to the rate of the reverse reaction.

The rates are the same.

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

H₂O(g): increases/higher

CO₂(g): decreases/lower

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

gas

(g)

56 [1] Allow 1 credit for 111 g/mol *or* any value from 110. g/mol to 111.1 g/mol, inclusive.

57 [1] Allow 1 credit for C₂H₂Cl₂. The order of the elements may vary.

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

Electrons are transferred from the metal to the nonmetal.

Calcium loses electrons and chlorine gains electrons.

Electrons were transferred.

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

The hydrocarbon has a double carbon-carbon bond.

The molecule has a C=C bond.

There is a multiple bond.

More H atoms could be bonded with this hydrocarbon.

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

halide

halocarbons

alkyl halide

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

Triad 1

S, Se, Te

sulfur, selenium, tellurium

sulfur triad

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

In the ground state, an atom of each of the elements has two valence electrons.

An atom of each element has the same number of electrons in the outermost shell.

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

As the atomic number increases, the first ionization energy decreases.

The first ionization energy decreases.

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

The volume of the 100.-gram lithium sample is 187 cm^3 and the volume of the 100.-gram potassium sample is 112 cm^3 .

The volume of the K sample is approximately 75 cm^3 less than the Li sample.

The volume of the Li sample is larger.

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

$$\frac{40. \text{ u} + 137 \text{ u}}{2}$$

$$\frac{40 + 137}{2}$$

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 heat released by the reaction is represented on the right side of the equation.

The energy term appears on the product side of the equation.

Heat is released.

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

The products of the reaction are different substances than the reactants.

The chemical properties of the reactants and the products are different.

Bonds are broken in the reactants and new bonds are formed in the products.

Different substances are formed.

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

$$\frac{6(12.011 \text{ g/mol})}{162.1 \text{ g/mol}} \times 100$$

$$\frac{(12 \text{ g/mol})(6)(100)}{162.1 \text{ g/mol}}$$

$$\frac{72.066}{162.1} \times 100$$

69 [1] Allow 1 credit for _____ CH₄(g) + _____ H₂O(g) + energy → _____ CO(g) + 3 H₂(g)

Allow credit even if the coefficient “1” is written in front of CH₄(g), H₂O(g), and/or CO(g).

70 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

An increase in temperature causes a greater number of effective collisions between methane and water molecules to occur.

A greater number of collisions per second make the reaction rate faster.

More molecules collide with sufficient energy.

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

Interval A represents the heat of reaction.

Interval A represents the difference between the potential energy of the products and the potential energy of the reactants.



72 [1] Allow 1 credit for 150. mol. Significant figures do *not* need to be shown.

73 [1] Allow 1 credit for carbon *or* C.

74 [1] Allow 1 credit for 4 *or* four *or* 2 pairs.

75 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The reaction has two reactants that become one product.

Three molecules become one molecule.

Two substances form one.

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

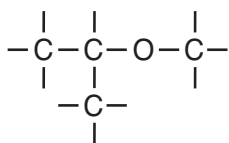
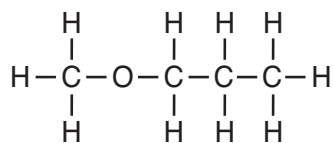
Diethyl ether has weaker intermolecular forces than water.

Water has stronger intermolecular forces.

Water has stronger IMF's due to its hydrogen bonding.

77 [1] Allow 1 credit.

Examples of 1-credit responses:



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

Electrical energy is required to cause a non-spontaneous chemical change.

The battery supplies the electricity needed for the reaction to occur.

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

The solution contains mobile ions.

The solution has ions that can move.

The $\text{Na}^+(\text{aq})$ and $\text{Cl}^-(\text{aq})$ move freely.

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

-2

2-

negative two

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

The pH starts at 7 and then increases.

The pH value of the solution before the battery is connected is lower than the pH value of the solution after the cell operates.

As the cell operates, the pH value of the solution goes up.

82 [1] Allow 1 credit for 132.

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



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

$$\frac{1}{4}$$

0.2500

25%

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

Bi-210 has an atomic number of 83 and becomes Po-210 with an atomic number of 84.

The number of protons in the nucleus changes when the bismuth isotope decays.

A different element forms.

Regents Examination in Physical Setting/Chemistry

August 2017

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

The *Chart for Determining the Final Examination Score for the August 2017 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> on Wednesday, August 16, 2017. 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

August 2017 Physical Setting/Chemistry

Question Numbers

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