

FOR TEACHERS ONLY

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

P.S.–CH PHYSICAL SETTING/CHEMISTRY

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

As atomic number increases, electronegativity decreases.

Electronegativity decreases.

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

ionic bond

ionic

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

Hg_2^{2+}

Pb^{2+}

mercury(I) ion

silver

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

fluorine

F

F_2

55 [1] Allow 1 credit for 18.

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

Both have 8 protons, but nucleus 2 has 10 neutrons while nucleus 4 has 11 neutrons.

equal in protons, unequal in neutrons

same atomic number, but different mass number

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

nucleus 3

3

neon

Ne

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

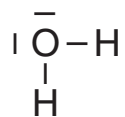
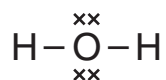
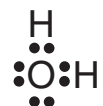
Energy is absorbed when bonds are broken.

Breaking the bond in H_2 is endothermic.

PE increases.

59 [1] Allow 1 credit.

Examples of 1-credit responses:



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

The oxygen atom has a stronger attraction for electrons than a hydrogen atom.

The electronegativity of oxygen is 3.4 and hydrogen is 2.2.

The H atom has a weaker attraction for electrons.

61 [1] Allow 1 credit for C *or* carbon.

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

Heat is transferred from the water to the test tube.

The test tube absorbs thermal energy from the water.

Stearic acid gained heat from the water.

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

$$(320. \text{ g})(4.18 \text{ J/g}\cdot\text{K})(98.0^\circ\text{C} - 74.0^\circ\text{C})$$

$$(320. \text{ g})(4.18 \text{ J/g}\cdot\text{K})(347 \text{ K} - 371 \text{ K})$$

$$(320)(4.18)(24)$$

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

β^-

beta decay

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

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

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

Hydrogen-3 is converted to helium-3.

One element is changed into a different element.

Atomic number changes.

The number of protons in the nucleus changed.

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 Si *or* silicon.

67 [1] Allow 1 credit for gas *or* (g).

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

Sodium reacts vigorously with cold water, but aluminum has no observable reaction.

Only the Na has an observable reaction.

69 [1] Allow 1 credit for $\underline{4}$ NH₃(g) + $\underline{3}$ O₂(g) → $\underline{2}$ N₂(g) + $\underline{6}$ H₂O(g) + energy

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

$$4.2 \text{ mol} = \frac{x}{32 \text{ g/mol}}$$

$$(4.2 \text{ mol}) \left(\frac{32 \text{ g}}{1 \text{ mol}} \right)$$

$$(32)(4.2)$$

71 [1] Allow 1 credit for 800. kPa. Significant figures do *not* need to be shown.

72 [1] Allow 1 credit for CH₂. The order of the elements may vary.

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

Ethene is classified as an unsaturated hydrocarbon because each molecule contains a double bond.

There is a C = C bond in each molecule.

More hydrogen atoms can be bonded to this hydrocarbon.

A C₂H₄ molecule has a multiple carbon-carbon bond.

74 [1] Allow 1 credit for any value from 28 g/mol to 28.1 g/mol, inclusive.

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

The arrangement of the H₂O(l) molecules is more random than the H₂O(s) molecules.

The molecules in ice have a rigid, orderly arrangement.

76 [1] Allow 1 credit for 668 J *or* -668 J.

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

chemical potential energy

chemical

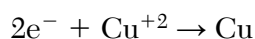
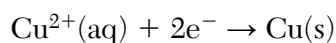
potential

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

Electrons flow from the zinc electrode to the copper electrode through the wires and voltmeter.

The e⁻ flow is from Zn to Cu.

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



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

Cu electrode: mass increases
Zn electrode: mass decreases

Cu electrode: increases
Zn electrode: decreases

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

$$\frac{70.0 \text{ g}}{100. \text{ g} + 70.0 \text{ g}} \times 100$$

$$\frac{70(100)}{170}$$

$$\frac{70}{170} = \frac{x}{100}$$

82 [1] Allow 1 credit for any value from 12 g to 16 g, inclusive.

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

The $\text{HC}_2\text{H}_3\text{O}_2(\text{aq})$ has ions in water, which are mobile.

The charged particles move freely.

Acetic acid forms moveable ions in aqueous solution.

84 [1] Allow 1 credit for yellow.

85 [1] Allow 1 credit for 3.4.

Regents Examination in Physical Setting/Chemistry

June 2017

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

The *Chart for Determining the Final Examination Score for the June 2017 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> on Tuesday, June 20, 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

June 2017 Physical Setting/Chemistry

Question Numbers

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