FOR TEACHERS ONLY

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

P.S.–CH PHYSICAL SETTING/CHEMISTRY

Thursday, January 25, 2018 — 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 . . . . . **1**	9 . . . . . **3**	17 . . . . . **1**	25 . . . . . **4** . . . . .
2 . . . . . **3**	10 . . . . . **1**	18 . . . . . **4**	26 . . . . . **4** . . . . .
3 . . . . . **2**	11 . . . . . **4**	19 . . . . . **1**	27 . . . . . **3** . . . . .
4 . . . . . **1**	12 . . . . . **2**	20 . . . . . **4**	28 . . . . . **4** . . . . .
5 . . . . . **1**	13 . . . . . **1**	21 . . . . . **3**	29 . . . . . **1** . . . . .
6 . . . . . **2**	14 . . . . . **3**	22 . . . . . **4**	30 . . . . . **3** . . . . .
7 . . . . . **3**	15 . . . . . **2**	23 . . . . . **1**	
8 . . . . . **2**	16 . . . . . **2**	24 . . . . . **1**	

Part B–1

31 . . . . . **4**	36 . . . . . **3**	41 . . . . . **4**	46 . . . . . **1** . . . . .
32 . . . . . **2**	37 . . . . . **2**	42 . . . . . **1**	47 . . . . . **4** . . . . .
33 . . . . . **1**	38 . . . . . **2**	43 . . . . . **4**	48 . . . . . **1** . . . . .
34 . . . . . **3**	39 . . . . . **1**	44 . . . . . **4**	49 . . . . . **4** . . . . .
35 . . . . . **2**	40 . . . . . **4**	45 . . . . . **3**	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 Thursday, January 25, 2018. 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.

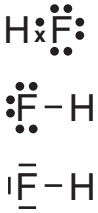
Part B–2

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

51 [1] Allow 1 credit for −39°C.

52 [1] Allow 1 credit.

Examples of 1-credit responses:



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

$q = (102.3\ g)(2260\ J/g)$

2260×102.3

54 [1] Allow 1 credit for yellow.

55 [1] Allow 1 credit for A and D.

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

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

Electrons lose energy as they return to a lower energy state.

Excited electrons emit energy in the form of light as they return to lower electron shells.

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

forms ionic bonds with active metals

forms ionic bonds

reacts with metals

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

In the ground state, the atomic radius of an iodine atom is smaller than the atomic radius of a rubidium atom.

The Rb atom is larger than the I atom.

The Rb atomic radius is 215 pm, but the I atomic radius is only 136 pm.

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

Rubidium is a better electrical conductor than iodine at STP.

$I_2(s)$ is a poor conductor; Rb(s) is a good conductor.

60 [1] Allow 1 credit for _____ $P_4(s)$ + ___6___ $Cl_2(g) \rightarrow$ ___4___ $PCl_3(\ell)$ + energy

Allow credit even if the coefficient "1" is written in front of $P_4(s)$.

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

Two elements are chemically combined to form a compound.

Two reactants form only one product.

Two substances react to form one substance.

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

$$\frac{3(35.5\ \text{g/mol})}{137\ \text{g/mol}} \times 100$$

$$\frac{3(35.453)}{137} \times 100$$

$$\frac{106 \times 100}{137}$$

$$\frac{3(35)}{136} \times 100$$

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

An atom of U-238 has 92 protons and 146 neutrons. An atom of U-234 also has 92 protons but has 142 neutrons.

These two atoms have the same number of protons but a different number of neutrons.

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

beta particle	beta
β^-	$^{0}_{-1}\beta$
$^{0}_{-1}e$	electron

65 [1] Allow 1 credit for 96.40 d. Significant figures do *not* need to be 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 CCl_2. The order of the elements may vary.

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

carbonate ion

carbonate

CO_3^{2-}

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

from oven air to muffin batter

from air to muffin

from air to batter

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

The potential energy of the liquid water molecules is less than the potential energy of the water vapor molecules.

There is greater PE in the $H_2O(g)$.

70 [1] Allow 1 credit for 4 *or* four.

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

$$V = \frac{(104.0\text{ kPa})(2.5\text{ mL})(282\text{ K})}{(618.3\text{ kPa})(293\text{ K})}$$

$$\frac{(618.3\text{ kPa})V}{282\text{ K}} = \frac{(104.0\text{ kPa})(2.5\text{ mL})}{293\text{ K}}$$

$$\frac{(104)(2.5)(282)}{(293)(618.3)}$$

72 [1] Allow 1 credit for 0.0030 g *or* 3×10^{-3} g.

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

There are 58 kJ of energy produced by the forward reaction.

The heat term is on the right side of the equation.

74 [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 at equilibrium.

The rates are the same.

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

Increase the temperature.

Add heat.

Decrease the pressure.

Increase the volume.

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

The NO_2 has stronger intermolecular forces of attraction than N_2.

The attractions in $N_2(g)$ are weaker.

77 [1] Allow 1 credit for +4 *or* 4+ *or* four.

78 [1] Allow 1 credit for 2.5 mol.

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

The porous barrier allows for the migration of ions between the half-cells.

The barrier maintains electrical neutrality by allowing ions to flow.

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

Magnesium is more active than zinc.

The Zn is less active than Mg.

Mg is higher on Table *J*.

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

$Mg(s) \rightarrow Mg^{2+}(aq) + 2e^{-}$

$Mg \rightarrow 2e^{-} + Mg^{+2}$

82 [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.

Ethene molecules contain a multiple carbon-carbon bond.

Less than the maximum number of hydrogen atoms are bonded to the carbons.

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

halide

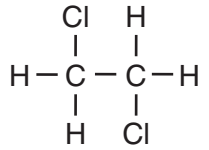
halocarbons

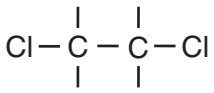
alkyl halide

halogenoalkane

84 [1] Allow 1 credit.

Examples of 1-credit responses:





85 [1] Allow 1 credit for 4 *or* four *or* 2 pairs.

Regents Examination in Physical Setting/Chemistry

January 2018

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

The *Chart for Determining the Final Examination Score for the January 2018 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Thursday, January 25, 2018. 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 2018 Physical Setting/Chemistry			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		33, 39, 51, 53, 62	70, 71
Math Key Idea 2		42, 60	78, 81
Math Key Idea 3		31, 36, 37, 44, 65	66, 72, 77, 81
Science Inquiry Key Idea 1		37, 47, 54, 55, 56, 57, 58, 59, 61, 63	73, 74, 75, 82
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3		34, 38, 44, 45, 50, 55, 56, 60, 64	66, 67, 73, 77, 79, 82, 85
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1			68
Key Idea 2		41, 52, 64	84
Key Idea 3		48	
Key Idea 4			75
Key Idea 5		49	
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		32, 33, 35, 36, 39, 41, 43, 45, 46, 50, 54, 55, 57, 58, 60, 63	66, 71, 74, 75, 78, 79, 80, 81, 83, 84
Key Idea 4		40, 49, 53, 64, 65	69, 73
Key idea 5		52	76
Standard 4			
Key Idea 3	1, 2, 3, 4, 5, 6, 7, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29	31, 32, 33, 34, 35, 36, 38, 39, 41, 43, 45, 46, 47, 48, 50, 51, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63	66, 67, 70, 71, 72, 74, 75, 77, 78, 79, 80, 81, 83, 84
Key Idea 4	18, 30	40, 44, 49, 53, 64, 65	68, 69, 73
Key Idea 5	8, 9, 10, 11, 12, 28	37, 42, 52	76, 82, 85
Reference Tables			
2011 Edition	1, 3, 4, 5, 8, 10, 14, 20, 25, 29	31, 32, 35, 36, 37, 38, 39, 42, 44, 45, 51, 52, 53, 54, 58, 59, 62	67, 71, 72, 76, 77, 80, 82, 83, 84