

# FOR TEACHERS ONLY

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

## P.S.–CH PHYSICAL SETTING/CHEMISTRY

Thursday, January 26, 2012 — 1:15 to 4:15 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/apda/> 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			Part B–1	
1 ..... 4.....	11 ..... 2.....	21 ..... 2.....	31 ..... 4.....	41 ..... 1.....
2 ..... 3.....	12 ..... 1.....	22 ..... 3.....	32 ..... 3.....	42 ..... 3.....
3 ..... 2.....	13 ..... 4.....	23 ..... 4.....	33 ..... 1.....	43 ..... 4.....
4 ..... 3.....	14 ..... 4.....	24 ..... 2.....	34 ..... 2.....	44 ..... 3.....
5 ..... 1.....	15 ..... 4.....	25 ..... 4.....	35 ..... 1.....	45 ..... 1.....
6 ..... 2.....	16 ..... 1.....	26 ..... 1.....	36 ..... 4.....	46 ..... 2.....
7 ..... 1.....	17 ..... 1.....	27 ..... 4.....	37 ..... 3.....	47 ..... 1.....
8 ..... 3.....	18 ..... 4.....	28 ..... 2.....	38 ..... 2.....	48 ..... 4.....
9 ..... 3.....	19 ..... 2.....	29 ..... 3.....	39 ..... 4.....	49 ..... 3.....
10 ..... 2.....	20 ..... 2.....	30 ..... 3.....	40 ..... 1.....	50 ..... 2.....

## Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Physical Setting/Chemistry examination. Additional information about scoring is provided in the publication *Information Booklet for Scoring Regents Examinations in the Sciences*.

Use only *red* ink or *red* pencil in rating Regents papers. Do *not* correct the student's work by making insertions or changes of any kind.

For Part A and Part B–1, indicate by means of a check mark each incorrect or omitted answer. In the box provided at the end of each part, record the number of questions the student answered correctly for that part.

At least two science teachers must participate in the scoring of each student's responses to the Part B–2 and Part C open-ended questions. 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.

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. Complete sentences are *not* required. Phrases, diagrams, and symbols may be used. In the student's answer booklet, record the number of credits earned for each answer in the box printed to the right of the answer lines or spaces for that question.

Fractional credit is *not* allowed. Only whole-number credit may be given to a response. Units need not be given when the wording of the questions allows such omissions.

Raters should enter the scores earned for Part A, Part B–1, Part B–2, and Part C on the appropriate lines in the box printed on the answer booklet and then should add these four scores and enter the total in the box labeled "Total Written Test 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/apda/> on Thursday, January 26, 2012. The student's scale score should be entered in the labeled box on the student's answer booklet. The scale score is the student's final examination score. On the front of the student's answer booklet, raters must enter their initials on the lines next to "Rater 1" or "Rater 2."

**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 an ionic radius value greater than 181 pm and less than 220. pm.

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

A  $K^+$  ion has three electron shells and an  $Na^+$  ion has only two.

A sodium ion has fewer electron shells than a potassium ion.

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

Particle: electron

Charge of particle: -1

Particle: electron

Charge of particle: negative

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

As the elements in Group 1 are considered in order of increasing atomic number, first ionization energy decreases.

As atomic number increases, first ionization energy decreases.

**55** [1] Allow 1 credit for  $90^\circ C \pm 2^\circ C$ .

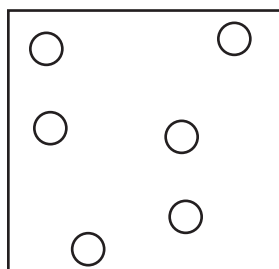
**56** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

minute 16

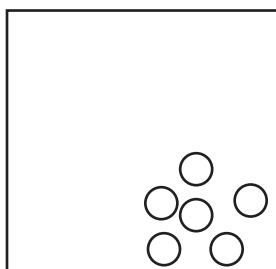
at 16 minutes

57 [1] Allow 1 credit. Particles of the gas must be drawn farther apart than particles of the liquid.

**Example of a 1-credit response:**



One phase of the sample at minute 4



A different phase of the sample at minute 4

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

A hydrocarbon 1 molecule has two carbon-carbon double bonds and a hydrocarbon 2 molecule has one carbon-carbon triple bond.

Both hydrocarbons have at least one multiple covalent bond between two carbon atoms.

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

The molecular formulas of the two hydrocarbons are the same, but the structural formulas are different.

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

Ni(s) key

key

nickel

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

The cell requires electrical energy for the nonspontaneous reaction to occur.

The power source causes some Ag(s) atoms to oxidize.

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

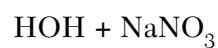
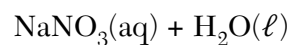
Silver atoms lose electrons and become silver ions in the solution.

Some of the Ag atoms become Ag<sup>+</sup> ions.

Silver atoms are oxidized to silver ions.

**63** [1] Allow 1 credit for 3 *or* three.

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



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

$$M_A(35.0 \text{ mL}) = (0.15 \text{ M})(30.0 \text{ mL})$$

$$0.15 \times \frac{30}{35}$$

### 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  $\text{BaCl}_2$ .

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

ionic bonds and polar covalent bonds

covalent and ionic

**68** [1] Allow 1 credit for +4.

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

When electrons in the ions move from higher energy states to lower energy states, lights of specific wavelengths are emitted.

Light is emitted when electrons return from higher electron shells to lower electron shells.

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

unsaturated solution

unsaturated

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

The  $\text{H}^+$  ions and the  $\text{Cl}^-$  ions are distributed uniformly throughout the solution.

There is an even distribution of  $\text{H}^+(\text{aq})$  and  $\text{Cl}^-(\text{aq})$ .

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

Fe

oxygen

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

Iron reacts with oxygen to form a compound.

An iron atom can lose three electrons.

The Fe atoms can form positive ions.

74 [1] Allow 1 credit for  $\underline{\quad 2 \quad}$  Fe(s) +  $\underline{\quad \quad \quad}$  O<sub>2</sub>(g) +  $\underline{\quad 2 \quad}$  H<sub>2</sub>O(l) →  $\underline{\quad 2 \quad}$  Fe(OH)<sub>2</sub>(s).

Allow credit even if the coefficient “1” is written in front of O<sub>2</sub>(g).

75 [1] Allow 1 credit for yellow.

76 [1] Allow 1 credit. Significant figures do *not* need to be shown. Acceptable responses include, but are not limited to:

$4.0 \times 10^{-4}$  mol

0.000 40 mol

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

$$\frac{6(16 \text{ g/mol})}{176 \text{ g/mol}} \times 100$$

$$\frac{(96)(100)}{176}$$

78 [1] Allow 1 credit for C<sub>3</sub>H<sub>4</sub>O<sub>3</sub>. The order of the elements can vary.

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

When the pressure in the cylinder is increased, the SO<sub>2</sub>(g) molecules and O<sub>2</sub>(g) molecules collide more frequently, producing more SO<sub>3</sub>(g).

80 [1] Allow 1 credit for 196 kJ.

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

The concentration of SO<sub>3</sub>(g) increases.

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

Nuclear radiation is harmful to all living cells.

Radioisotopes can cause gene mutations.

Treatments can cause stomach problems, such as nausea.

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

Gamma radiation has greater penetrating power.

Beta particles have weaker penetrating power.

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



nickel-60

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

15.813 y

15.8 y



## Regents Examination in Physical Setting/Chemistry

January 2012

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

**The *Chart for Determining the Final Examination Score for the January 2012 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site at: <http://www.p12.nysed.gov/apda/> on Thursday, January 26, 2012. 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

<b>January 2012 Physical Setting/Chemistry</b>			
<b>Question Numbers</b>			
Key Ideas/Performance Indicators	Part A	Part B	Part C
<b>Standard 1</b>			
Math Key Idea 1		36, 54, 56, 63	
Math Key Idea 2			
Math Key Idea 3		34, 51, 65	66, 68, 77, 80
Science Inquiry Key Idea 1		49, 52, 61, 62	67, 69, 71
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3		32, 41, 46, 50, 53, 59	78
Engineering Design Key Idea 1			
<b>Standard 2</b>			
Key Idea 1			72, 73
Key Idea 2			
Key Idea 3			
<b>Standard 6</b>			
Key Idea 1			
Key Idea 2			
Key Idea 3		48	
Key Idea 4			81
Key Idea 5		38	
<b>Standard 7</b>			
Key Idea 1			76, 82
Key Idea 2			
<b>Standard 4 Process Skills</b>			
Key Idea 3		31, 33, 39, 40, 42, 43, 45, 47, 54, 57, 58, 60, 64	74, 75, 79, 83
Key Idea 4		37, 44, 55	84, 85
Key idea 5		35	70
<b>Standard 4</b>			
Key Idea 3	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 15, 17, 18, 19, 20, 23, 24, 25, 26, 27, 29, 30	31, 32, 33, 39, 40, 41, 42, 43, 45, 46, 47, 48, 50, 51, 52, 54, 57, 58, 59, 60, 61, 62, 63, 64, 65	66, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 83
Key Idea 4		36, 37, 44, 55, 56	82, 84, 85
Key Idea 5	10, 13, 14, 16, 21, 22, 28	34, 35, 38, 49, 53	67, 70
<b>Reference Tables</b>			
2011 Edition	1, 2, 5, 6, 7, 8, 9, 11, 12, 13, 21, 26, 27, 28, 30	31, 35, 38, 39, 40, 46, 47, 65	66, 67, 68, 70, 75, 76, 77, 84, 85