

# FOR TEACHERS ONLY

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

## P.S.–CH PHYSICAL SETTING/CHEMISTRY

Wednesday, January 29, 2014 — 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/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 . . . . . 1 . . . . .	17 . . . . . 4 . . . . .	25 . . . . . 1 . . . . .
2 . . . . . 3 . . . . .	10 . . . . . 4 . . . . .	18 . . . . . 3 . . . . .	26 . . . . . 3 . . . . .
3 . . . . . 2 . . . . .	11 . . . . . 2 . . . . .	19 . . . . . 2 . . . . .	27 . . . . . 1 . . . . .
4 . . . . . 1 . . . . .	12 . . . . . 3 . . . . .	20 . . . . . 1 . . . . .	28 . . . . . 4 . . . . .
5 . . . . . 3 . . . . .	13 . . . . . 1 . . . . .	21 . . . . . 2 . . . . .	29 . . . . . 2 . . . . .
6 . . . . . 4 . . . . .	14 . . . . . 4 . . . . .	22 . . . . . 3 . . . . .	30 . . . . . 4 . . . . .
7 . . . . . 2 . . . . .	15 . . . . . 4 . . . . .	23 . . . . . 3 . . . . .	
8 . . . . . 3 . . . . .	16 . . . . . 2 . . . . .	24 . . . . . 2 . . . . .	
Part B–1			
31 . . . . . 1 . . . . .	36 . . . . . 3 . . . . .	41 . . . . . 3 . . . . .	46 . . . . . 2 . . . . .
32 . . . . . 1 . . . . .	37 . . . . . 4 . . . . .	42 . . . . . 1 . . . . .	47 . . . . . 1 . . . . .
33 . . . . . 4 . . . . .	38 . . . . . 2 . . . . .	43 . . . . . 4 . . . . .	48 . . . . . 2 . . . . .
34 . . . . . 1 . . . . .	39 . . . . . 1 . . . . .	44 . . . . . 4 . . . . .	49 . . . . . 3 . . . . .
35 . . . . . 3 . . . . .	40 . . . . . 1 . . . . .	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 Wednesday, January 29, 2014. 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:

Si

silicon

element 14

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

As atomic number increases, the electronegativity increases.

Electronegativity increases.

from lower to higher

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

White phosphorus has fewer atoms per  $\text{cm}^3$ .

Red has more.

**Note:** Do *not* allow credit for a response that only indicates the number of atoms per  $\text{cm}^3$  in red phosphorus is different from the number of atoms per  $\text{cm}^3$  in white phosphorus.

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

Ga

indium

element 31

element 49

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

The entropy of  $\text{KNO}_3(\text{s})$  is less than the entropy of  $\text{KNO}_3(\text{aq})$ .

The  $\text{KNO}_3(\text{aq})$  is more disordered.

The solution is more random than the solid.

**Note:** Do *not* allow credit for a response that only indicates the entropies are different.

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

Both samples are at  $20.^\circ\text{C}$ , but the larger sample has more matter.

The larger sample has twice as many particles.

The total thermal energy is directly proportional to the masses of the samples.

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

The boiling point of the  $\text{NaNO}_3$  solution is higher than the boiling point of water.

lower for  $\text{H}_2\text{O}$

**58** [1] Allow 1 credit for 30 g/mol, 30. g/mol, *or* for any value from 30.06 g/mol to 30.1 g/mol, inclusive.

**59** [1] Allow 1 credit for 4 *or* four.

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

The catalyzed reaction pathway has a lower activation energy than the original reaction.

Less energy is needed.

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

Hydrogen atoms are added to the ethene molecule at the site of the carbon-carbon double bond to form a single molecule.

Two reactants combine to form a single product.

Two substances form one.

Two hydrogen atoms are added at  $\text{C}=\text{C}$ .

An unsaturated reactant becomes a saturated product.

The reaction is a hydrogenation reaction, which is a type of addition reaction.

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

$$(0.026 \text{ M})(50.0 \text{ mL}) = M_B (38.5 \text{ mL})$$

$$\frac{(0.026)(50)}{38.5}$$

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



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



alcohol

hydroxyl

hydroxy group

**Note:** Do *not* allow credit for hydroxide ion *or* hydroxyl radical *or*  $\text{OH}^-$ .

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

The number of each kind of atom is the same in both, but their structures are not the same.

Their molecular formulas are the same, but their structural arrangement of atoms is different.

same molecular formula but different structural formulas

The only difference is the arrangement of the atoms.

### 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:

sodium hydrogen carbonate

sodium bicarbonate

sodium acid carbonate

monosodium carbonate

bicarbonate of soda

**67** [1] Allow 1 credit for 14% *or* for any value from 14.28% to 14.3%, inclusive.

**68** [1] Allow 1 credit for blue.

**69** [1] Allow 1 credit for any value from 61 g to 63 g, inclusive.

**70** [1] Allow 1 credit for   2    $\text{NH}_4\text{Cl}$  +         $\text{CaO}$   $\rightarrow$    2    $\text{NH}_3$  +         $\text{H}_2\text{O}$  +         $\text{CaCl}_2$ .

**Note:** Allow credit even if the coefficient “1” is written in front of  $\text{CaO}$ ,  $\text{H}_2\text{O}$ , and/or  $\text{CaCl}_2$ .

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

There is a greater electronegativity difference in a C–O bond than in a C–H bond.

The C–O bond is more polar because the electronegativity difference for a C–O bond is 0.8, and the electronegativity difference for a C–H bond is 0.4.

The C–H bond has a smaller difference.

The C–O is .8 and the C–H is .4.



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

Ar

argon

element 18

**78** [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.

They are the same.

equal

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

0 to -1

0 to 1-

zero to negative one

0 to minus one

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

The container must be closed so that no matter can enter or leave, thus disturbing the equilibrium.

If the container is open,  $\text{Cl}_2$  gas escapes.

to keep the concentrations of the reactants and products constant

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

The concentration of the  $\text{ClO}^-$  ion decreases.

$[\text{ClO}^-]$  decreases.

lower  $\text{ClO}^-$  concentration

less  $\text{ClO}^-$



**82** [1] Allow 1 credit for 74.

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

I-127 atoms and I-131 atoms have the same number of protons, but different numbers of neutrons.

Both have 53 p, but I-127 has 74 n while I-131 has 78 n.

They have the same atomic number but different mass numbers.

same atomic number but different numbers of neutrons

The only difference is the number of neutrons.

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

$^{104}_{51}\text{Sb}$

$^{104}\text{Sb}$

Sb-104

antimony-104

**85** [1] Allow 1 credit for 48 d, 48.0 d, 48.1 d, *or* for any value from 48.12 d to 48.13 d, inclusive.

## Regents Examination in Physical Setting/Chemistry

January 2014

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

**The *Chart for Determining the Final Examination Score for the January 2014 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> on Wednesday, January 29, 2014. 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 2014 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		62	69, 73
Math Key Idea 2		59	69, 70, 71, 73
Math Key Idea 3		44, 45, 51, 58	67, 71, 79, 84, 85
Science Inquiry Key Idea 1		35, 40, 53, 55, 56, 57, 59, 60, 64, 65	72, 74, 75, 78, 80, 83
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3		33, 34, 37, 39, 40, 47, 50, 51, 52, 54, 61, 63	66, 68, 70, 74, 77, 79, 82
Engineering Design Key Idea 1			
<b>Standard 2</b>			
Key Idea 1			
Key Idea 2			
<b>Standard 6</b>			
Key Idea 1		36	
Key Idea 2		38, 65	
Key Idea 3			
Key Idea 4			80, 81
Key Idea 5		40	
<b>Standard 7</b>			
Key Idea 1			
Key Idea 2			
<b>Standard 4 Process Skills</b>			
Key Idea 3		31, 32, 35, 38, 39, 42, 43, 44, 46, 51, 52, 54, 58, 62, 63, 64	68, 69, 70, 75, 78, 81, 82, 83
Key Idea 4		34, 40, 41, 45, 48, 49, 56	84, 85
Key Idea 5			76, 77
<b>Standard 4</b>			
Key Idea 3	1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29	31, 32, 37, 38, 39, 42, 43, 44, 46, 47, 48, 51, 52, 54, 55, 57, 58, 60, 61, 62, 63, 64, 65	66, 67, 68, 69, 70, 75, 78, 79, 80, 81, 82, 83
Key Idea 4	14, 30	36, 40, 45, 49, 56	84, 85
Key Idea 5	7, 8, 9	33, 34, 35, 41, 50, 53, 59	71, 72, 73, 74, 76, 77
<b>Reference Tables</b>			
2011 Edition	1, 2, 3, 5, 6, 11, 16, 21, 22, 23, 24, 26, 28, 29	31, 35, 38, 42, 43, 45, 48, 50, 51, 52, 53, 54, 57, 58, 59, 62, 63, 64	66, 67, 68, 69, 71, 73, 75, 76, 77, 82, 83, 84, 85