

FOR TEACHERS ONLY

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

P.S.–CH PHYSICAL SETTING/CHEMISTRY

Tuesday, June 23, 2015 — 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 4	9 4	17 1	25 1
2 1	10 2	18 4	26 2
3 4	11 2	19 4	27 1
4 4	12 4	20 2	28 3
5 2	13 3	21 1	29 4
6 4	14 3	22 1	30 1
7 1	15 1	23 1	
8 1	16 1	24 3	
Part B–1			
31 3	36 1	41 2	46 2
32 2	37 2	42 4	47 4
33 4	38 3	43 3	48 3
34 3	39 4	44 2	49 4
35 1	40 1	45 1	50 2

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 23, 2015. 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 10.0 mL. Significant figures do *not* need to be shown.

52 [1] Allow 1 credit for 64 g, or any value from 62 g to 66 g, inclusive.

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

Both ethanol molecules and water molecules are polar.

Water molecules and ethanol molecules have similar polarity.

54 [1] Allow 1 credit for density.

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

Group 1

alkali metals

56 [1] Allow 1 credit for 5.0%. Significant figures do *not* need to be shown.

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

At equilibrium, the rates of the forward and reverse reactions are equal.

The rates are the same.

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

The equilibrium will shift to favor the formation of SO_3 .

The rate of the forward reaction is greater than the rate of the reverse reaction.

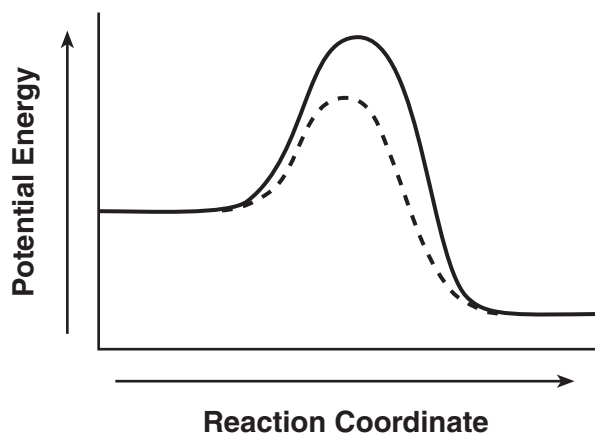
The equilibrium will shift to favor the forward reaction.

The equilibrium will shift to the right.

The concentrations of the reactants will decrease.

59 [1] Allow 1 credit.

Example of a 1-credit response:



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

All the carbon-to-carbon bonds are single bonds.

The maximum number of H atoms are bonded to the carbon chain.

There are no multiple bonds.

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

A molecule of compound *B* has an organic acid functional group and a molecule of compound *A* has no functional group.

A molecule of *A* has only single bonds and a molecule of *B* has one double-bonded oxygen atom.

A molecule of compound *B* has two O atoms and a molecule of compound *A* has no O atoms in its structure.

A is a hydrocarbon but *B* is an acid.

A is an alkane but *B* is an acid.

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

positron decay

β^+

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

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

${}_{20}^{40}\text{Ca}$

Ca-40

calcium-40

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

$\frac{1}{4}$

25%

0.25

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

$$\frac{(93.26)(38.96 \text{ u}) + (0.01)(39.96 \text{ u}) + (6.73)(40.96 \text{ u})}{100}$$

$$(93.26\%)(38.96 \text{ u}) + (0.01\%)(39.96 \text{ u}) + (6.73\%)(40.96 \text{ u})$$

$$(0.9326)(38.96) + (0.0673)(40.96) + (0.0001)(39.96)$$

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:

Atomic number: 4

Mass number: 9

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

Number of electrons in first shell: 2 or $2e^-$

Number of electrons in second shell: 2 or $2e^-$

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

Change in electron energy:

Electron energy increases.

An electron absorbs energy.

more energy

Change in electron location:

An electron moves to a higher electron shell.

from the first to the second shell

second to higher energy level

farther from the nucleus

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

carbon

C

70 [1] Allow 1 credit for 60. g/mol. Significant figures do *not* need to be shown.

71 [1] Allow 1 credit for $\text{CH}_4\text{N}_2\text{O}$. The order of the elements can vary.

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

There are the same number of atoms of each element on both sides of the equation.

No atoms are lost or gained.

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

The aqueous solutions of 2-propanol do not contain the same proportions of alcohol and water.
Rubbing alcohol is sold as 70.% and 91% solutions.

74 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The water and the 2-propanol have different boiling points.
strength of the intermolecular forces
boiling point
vapor pressure

75 [1] Allow 1 credit for 120 mL. Significant figures do *not* need to be shown.

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

KCl
K₂SO₄

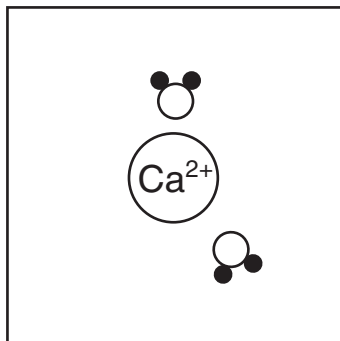
77 [1] Allow 1 credit for 39 mol. Significant figures do *not* need to be shown.

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

The radius of an Mg²⁺ ion is smaller than the radius of an Mg atom.
The atom has a larger radius than the ion.

79 [1] Allow 1 credit. Acceptable responses must show *at least two* water molecules with the oxygen atom of *each* water molecule oriented toward the calcium ion.

Example of a 1-credit response:



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

The HCl(g) is an Arrhenius acid because it yields $\text{H}_3\text{O}^+(\text{aq})$ ions.

The gaseous reactant increases the concentration of $\text{H}^+(\text{aq})$.

It produces hydrogen ions in water.

81 [1] Allow 1 credit for blue.

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

The hydronium ion concentration of the acidic solution is 10^4 times greater than the hydronium ion concentration in the water.

The H^+ concentration is less in the water.

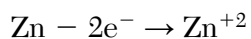
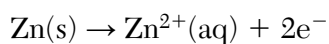
83 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

from the zinc-coated nail to the copper rod

from Zn to Cu

left to right

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



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

The H^+ ions that are reduced come from the phosphoric acid.

Phosphoric acid releases ions that are free to move.

H_3PO_4 is an electrolyte.

$\text{H}_3\text{PO}_4(\text{aq})$ can act as a salt bridge.

Regents Examination in Physical Setting/Chemistry

June 2015

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

The *Chart for Determining the Final Examination Score for the June 2015 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 23, 2015. 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 2015 Physical Setting/Chemistry			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		39, 46, 51, 52, 56, 59, 65	70
Math Key Idea 2		47, 49	71
Math Key Idea 3		38, 39, 46, 51, 63, 64	70, 75, 76, 77
Science Inquiry Key Idea 1		42, 45, 48, 50, 53, 54, 55, 61	69, 72, 73, 74, 78, 79, 80, 83, 85
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3		31, 32, 37, 41, 43, 44, 48, 49, 50, 54, 62	66, 67, 68, 72, 76, 81, 84
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2			73
Key Idea 3			
Standard 6			
Key Idea 1			
Key Idea 2		32, 45, 56, 59, 60, 61	79
Key Idea 3			82
Key Idea 4		58	
Key Idea 5		52	
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		31, 33, 34, 36, 37, 38, 40, 45, 46, 50, 51, 52, 54, 55, 57, 58, 65	66, 67, 68, 70, 71, 72, 74, 75, 77, 81, 83, 84
Key Idea 4		47, 59, 63, 64	
Key Idea 5		35, 49, 53	79
Standard 4			
Key Idea 3	1, 2, 3, 4, 10, 11, 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29	31, 32, 33, 34, 36, 37, 38, 39, 40, 42, 43, 44, 45, 46, 48, 50, 51, 52, 54, 55, 56, 57, 58, 59, 60, 61, 65	66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 80, 81, 82, 83, 84, 85
Key Idea 4	15, 30	47, 62, 63, 64	
Key Idea 5	5, 6, 7, 8, 9, 16	35, 41, 49, 53	78, 79
Reference Tables			
2011 Edition	1, 3, 6, 7, 8, 11, 12, 16, 17, 18, 24, 27, 29	31, 32, 33, 34, 35, 36, 39, 41, 44, 46, 48, 49, 51, 52, 55, 56, 60, 61, 62, 63, 64	66, 67, 68, 70, 75, 76, 77, 78, 79, 81, 83, 84