

FOR TEACHERS ONLY

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

PS-CH

PHYSICAL SETTING/CHEMISTRY

Wednesday, June 16, 2010 — 1:15 to 4:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 3 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 <http://www.emsc.nysed.gov/osa/> and select the link "Examination 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 1	11 3	21 1	31 1	41 2
2 3	12 1	22 4	32 3	42 4
3 3	13 2	23 4	33 1	43 4
4 3	14 4	24 2	34 2	44 3
5 1	15 2	25 2	35 3	45 2
6 4	16 1	26 2	36 3	46 4
7 3	17 1	27 3	37 4	47 3
8 4	18 4	28 4	38 3	48 3
9 2	19 4	29 4	39 1	49 1
10 3	20 4	30 3	40 1	50 1

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 all 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 <http://www.emsc.nysed.gov/osa/> on Wednesday, June 16, 2010. 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."

All student answer papers that receive a scale score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions that he/she scored in the first rating of the paper. The school principal is responsible for assuring that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

Because scale scores corresponding to raw scores in the conversion chart may change from one examination 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:

2

two

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

A Cl^- ion has 18 electrons and 17 protons, so there is less attraction by the nucleus for the electron shells, allowing the electron shells to expand.

The radius of Cl^- is larger because the nucleus can't hold 18 electrons as close as it can hold 17 electrons.

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

The bonding in each compound involves a transfer of valence electrons from the metal to the nonmetal.

Both metals lose all of their valence electrons.

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

The number of protons equals the number of electrons.

The atom has 11 protons and 11 electrons.

55 [1] Allow 1 credit for 2-8-1.

56 [2] Allow a maximum of 2 credits, allocated as follows:

- Allow 1 credit for a correct numerical setup. Acceptable responses include, but are not limited to:

$$(1)(14.0 \text{ g/mol}) + (2)(12.0 \text{ g/mol}) + (2)(16.0 \text{ g/mol}) + (5)(1.0 \text{ g/mol})$$

$$(1)(14) + (5)(1) + (2)(12) + (2)(16)$$

- Allow 1 credit for 75.0 g/mol *or* for a response consistent with the student's numerical setup. Significant figures do *not* need to be shown.

Note: Do *not* allow credit for a numerical setup and calculated result that are not related to the concept assessed by the question.

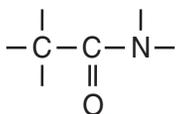
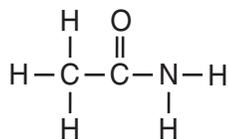
57 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

amine

— COOH

58 [1] Allow 1 credit.

Examples of 1-credit responses:



59 [1] Allow 1 credit. Significant figures do *not* need to be shown. Acceptable responses include, but are not limited to:

$$66\,800 \text{ J}$$

$$6.68 \times 10^4 \text{ J}$$

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

$$q = (200. \text{ g})(4.18 \text{ J/g}\cdot\text{°C})(65\text{°C})$$

$$(200)(4.18)(65)$$

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

The heat necessary to vaporize 200 grams of water is about seven times larger than the heat necessary to melt 200 grams of ice.

It takes more heat to vaporize the same amount of $\text{H}_2\text{O}(\ell)$.

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

fission

transmutation

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



xenon-142

64 [1] Allow 1 credit for 1.84 s. 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.

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

The solution made by the student is unsaturated.

unsaturated

66 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The boiling point of the solution at standard pressure is higher than the boiling point of water at standard pressure.

Water boils at a lower temperature.

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

Heat flows from the solution to the air in the laboratory.

The air gains heat from the solution.

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

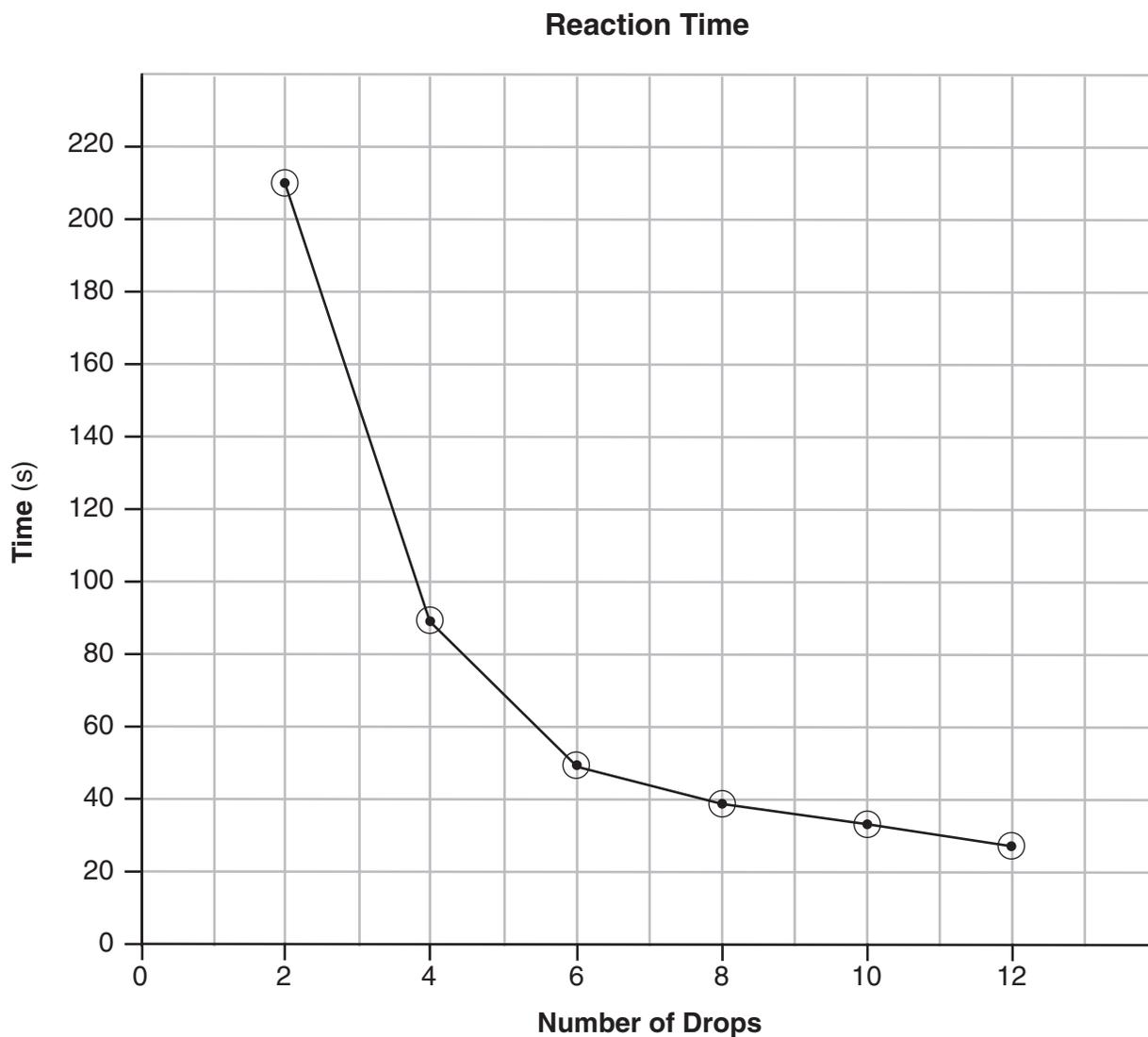
Gently heat the solution to evaporate the water until only solid KNO_3 remains.

Boil off the water.

69 [2] Allow a maximum of 2 credits, allocated as follows:

- Allow 1 credit for marking an appropriate scale on the axis labeled “Time (s).” An appropriate scale is linear and allows a trend to be seen.
- Allow 1 credit for correctly plotting all six points ± 0.3 grid space. Plotted points do *not* need to be circled or connected.

Example of a 2-credit response:



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

Increasing the number of drops of $\text{KIO}_3(\text{aq})$ increases the rate of reaction.

The reaction takes less time if more drops of KIO_3 are used.

The reaction occurs faster.

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

the temperature of the reactants

a catalyst

72 [1] Allow 1 credit for sodium carbonate.

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

decomposition

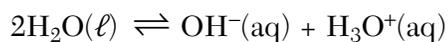
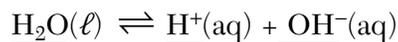
74 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The products of the reaction include two gases, while the reactant is a solid. The gases have greater entropy than the solid.

The $\text{NaHCO}_3(\text{s})$ reacts to produce $\text{H}_2\text{O}(\text{g})$ and $\text{CO}_2(\text{g})$ that have greater disorder.

75 [1] Allow 1 credit for 2120. kg. Significant figures do *not* need to be shown.

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



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

The H^+ ion concentration in tomato juice is 10^6 times greater.

The hydrogen ion concentration in tomato juice is greater than that in milk of magnesia.

Milk of magnesia has a lower concentration of H_3O^+ ions.

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

$\text{OH}^-(\text{aq})$

OH^-

hydroxide ion

79 [1] Allow 1 credit for blue.

80 [1] Allow 1 credit for Cu_2O .

81 [1] Allow 1 credit for -2 .

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

Copper is very malleable.

good conductor of heat

high melting point

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

An aluminum pan has less mass than a copper pan of the same size because aluminum is less dense.

Aluminum is less dense than copper.

A Cu pan would weigh more.

Regents Examination in Physical Setting/Chemistry

June 2010

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

The *Chart for Determining the Final Examination Score for the June 2010 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Wednesday, June 16, 2010. 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 www.emsc.nysed.gov/osa/exameval.
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 2010 Physical Setting/Chemistry			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		34, 41, 59, 60, 64	65, 69
Math Key Idea 2		33, 36, 39	70
Math Key Idea 3		41, 56, 59, 60, 64	75, 80, 81
Science Inquiry Key Idea 1		37, 49, 52, 53, 54, 61	66, 71, 77, 82, 83
Science Inquiry Key Idea 2		48	68, 83
Science Inquiry Key Idea 3		31, 35, 40, 42, 43, 47, 51, 54, 55, 57, 62	72, 73, 74, 78, 80, 81, 82
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1		42	
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1			67
Key Idea 2		32, 51	76
Key Idea 3			77
Key Idea 4			
Key Idea 5			70
Standard 7			
Key Idea 1			83
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		32, 33, 35, 36, 41, 43, 45, 46, 47, 49, 55, 56, 58	65, 66, 73, 74, 75, 76, 79
Key Idea 4		40, 44, 50, 59, 60, 61, 63, 64	
Key idea 5		38, 53	
Standard 4			
Key Idea 3	1, 2, 3, 4, 5, 6, 7, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28	31, 33, 34, 35, 36, 41, 42, 43, 44, 45, 46, 47, 48, 49, 54, 55, 56, 57, 58	65, 66, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83
Key Idea 4	12, 13, 21, 29	39, 40, 50, 59, 60, 61, 62, 63, 64	67
Key Idea 5	5, 8, 9, 10, 11, 23, 30	32, 37, 38, 51, 52, 53	
Reference Tables			
2002 Edition	4, 6, 8, 11, 14, 23, 25, 27, 29	32, 33, 35, 37, 39, 40, 41, 42, 44, 46, 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 64	65, 72, 78, 79, 80, 81, 83