

# FOR TEACHERS ONLY

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

# PS-CH

## PHYSICAL SETTING/CHEMISTRY

Wednesday, June 20, 2007 — 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 . . . . . <b>4</b> . . . . .	11 . . . . . <b>4</b> . . . . .	21 . . . . . <b>2</b> . . . . .	31 . . . . . <b>2</b> . . . . .	41 . . . . . <b>2</b> . . . . .
2 . . . . . <b>3</b> . . . . .	12 . . . . . <b>1</b> . . . . .	22 . . . . . <b>2</b> . . . . .	32 . . . . . <b>1</b> . . . . .	42 . . . . . <b>3</b> . . . . .
3 . . . . . <b>3</b> . . . . .	13 . . . . . <b>3</b> . . . . .	23 . . . . . <b>2</b> . . . . .	33 . . . . . <b>2</b> . . . . .	43 . . . . . <b>3</b> . . . . .
4 . . . . . <b>4</b> . . . . .	14 . . . . . <b>2</b> . . . . .	24 . . . . . <b>1</b> . . . . .	34 . . . . . <b>1</b> . . . . .	44 . . . . . <b>3</b> . . . . .
5 . . . . . <b>1</b> . . . . .	15 . . . . . <b>3</b> . . . . .	25 . . . . . <b>4</b> . . . . .	35 . . . . . <b>1</b> . . . . .	45 . . . . . <b>4</b> . . . . .
6 . . . . . <b>2</b> . . . . .	16 . . . . . <b>4</b> . . . . .	26 . . . . . <b>3</b> . . . . .	36 . . . . . <b>1</b> . . . . .	46 . . . . . <b>2</b> . . . . .
7 . . . . . <b>1</b> . . . . .	17 . . . . . <b>2</b> . . . . .	27 . . . . . <b>3</b> . . . . .	37 . . . . . <b>4</b> . . . . .	47 . . . . . <b>3</b> . . . . .
8 . . . . . <b>1</b> . . . . .	18 . . . . . <b>2</b> . . . . .	28 . . . . . <b>3</b> . . . . .	38 . . . . . <b>3</b> . . . . .	48 . . . . . <b>2</b> . . . . .
9 . . . . . <b>4</b> . . . . .	19 . . . . . <b>2</b> . . . . .	29 . . . . . <b>4</b> . . . . .	39 . . . . . <b>4</b> . . . . .	49 . . . . . <b>3</b> . . . . .
10 . . . . . <b>2</b> . . . . .	20 . . . . . <b>4</b> . . . . .	30 . . . . . <b>3</b> . . . . .	40 . . . . . <b>3</b> . . . . .	50 . . . . . <b>2</b> . . . . .



**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.

On the detachable answer sheet 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 scaled 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 20, 2007. The student's scaled score should be entered in the labeled box on the student's answer booklet. The scaled score is the student's final examination score.

All student answer papers that receive a scaled 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.

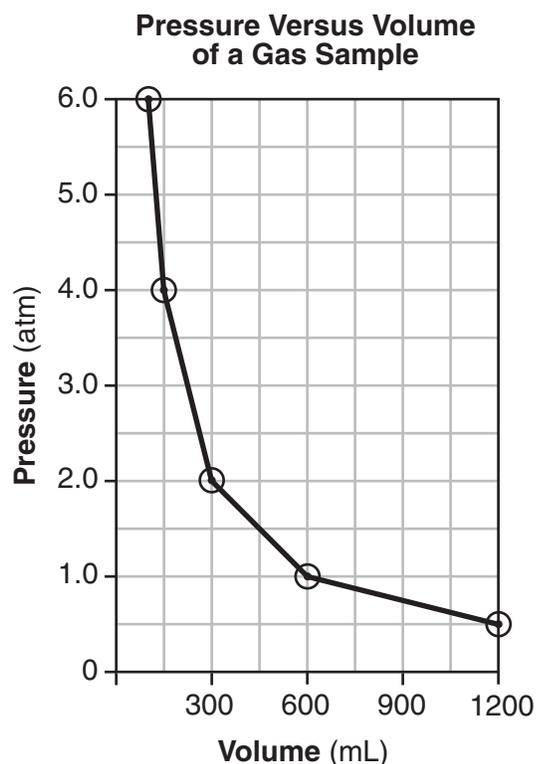
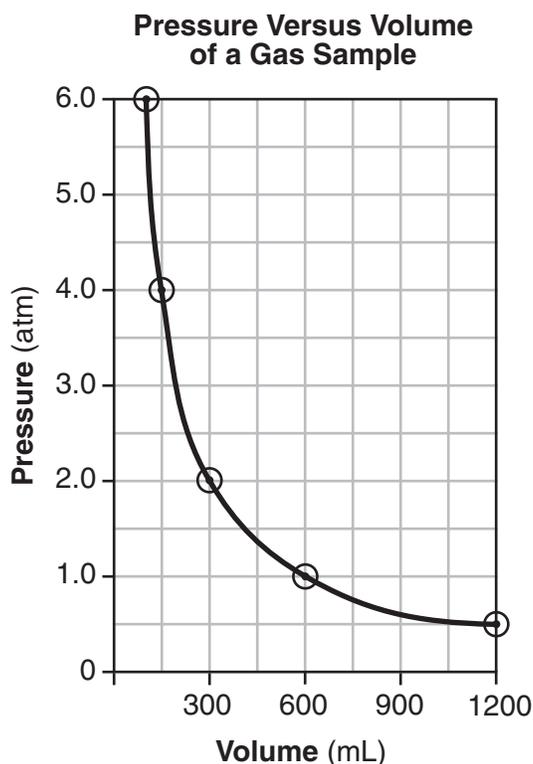
Because scaled scores corresponding to raw scores in the conversion chart may change from one examination to another, it is crucial that for each administration, the conversion chart provided for that administration be used to determine the student's final score.

**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 for marking an appropriate scale on the axis labeled “Volume (mL).” An appropriate scale is linear and allows a trend to be seen.
- 52** [1] Allow 1 credit for all five points plotted correctly  $\pm 0.3$  grid space. Plotted points do *not* need to be circled or connected.

**Examples of 2-credit responses to questions 51 and 52:**



- 53** [1] Allow 1 credit for 3.0 atm *or* for a response consistent with the student’s graph  $\pm 0.3$  grid space. Significant figures do *not* need to be shown.
- 54** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- As temperature increases, the rate of a chemical reaction increases because the reactant particles move faster and collide more often.
  - More reactant molecules have sufficient activation energy.
  - The number of effective collisions per unit time increases.

- 55 [1] Allow 1 credit for 53.3%. Significant figures do *not* need to be shown.
- 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:  
$$q = mC\Delta T = (5.00 \text{ g})(4.71 \text{ J/g}\cdot\text{K})(30. \text{ K})$$
$$(5)(4.71)(30)$$
  - Allow 1 credit for 710 J *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. *Both* potential energy and kinetic energy must be included in the student's response to receive credit. Acceptable responses include, but are not limited to:
- The potential energy of the ammonia molecules increases and the average kinetic energy of the ammonia molecules remains the same.
- PE increases and KE is constant.
- 58 [1] Allow 1 credit for 6850 J. Significant figures do *not* need to be shown.
- 59 [1] Allow 1 credit for  $\underline{2} \text{ KClO}_3(\text{s}) \rightarrow \underline{2} \text{ KCl}(\text{s}) + \underline{3} \text{ O}_2(\text{g})$ .
- 60 [1] Allow 1 credit for +5.

61 [1] Allow 1 credit for  ${}_{20}^{42}\text{Ca}$ .

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

A P–Cl bond is more polar than a P–S bond because the electronegativity difference for P–Cl is 1.0 and the electronegativity difference for P–S is 0.4.

Cl has a higher electronegativity value than S.

A chlorine atom has a greater attraction for electrons in a bond than a sulfur atom.

63 [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:

$$d = \frac{m}{V} = \frac{20.179 \text{ g}}{24.4 \text{ L}}$$

$$\frac{20}{24.4}$$

- Allow 1 credit for 0.827 g/L *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.

**Part C**

**Allow a total of 20 credits for this part. The student must answer all questions in this part.**

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

The sample is an unsaturated solution.

unsaturated

- 65** [1] Allow 1 credit. *Both* oxygen and water must be included in the student's response to receive credit. Acceptable responses include, but are not limited to:

Oxygen molecules are nonpolar and water molecules are polar.

Because H<sub>2</sub>O and O<sub>2</sub> have different polarities, O<sub>2</sub> has low solubility in H<sub>2</sub>O.

oxygen nonpolar, water polar

- 66** [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:

$$\text{ppm} = \frac{0.0070 \text{ gram O}_2}{(1000. \text{ grams of water} + 0.0070 \text{ gram of O}_2)} \times 1\,000\,000$$

$$(0.0070 / 1000.0070) \times 1\,000\,000$$

- Allow 1 credit for 7.0 ppm *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.

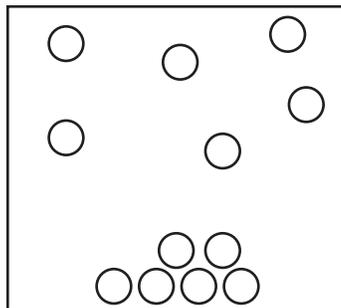
- 67** [1] Allow 1 credit for a pH value that is greater than or equal to 4.4, but is less than or equal to 5.5.

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



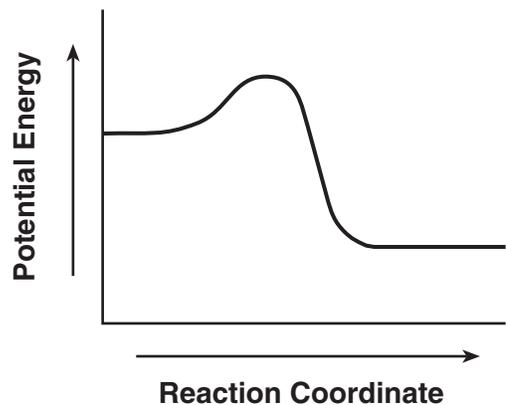
- 69 [1] Allow 1 credit. Molecules of the gas must be drawn farther apart than molecules of the liquid.

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



- 70 [1] Allow 1 credit.

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



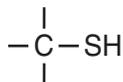
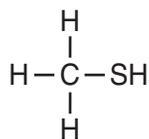
- 71 [1] Allow 1 credit. Significant figures do *not* need to be shown. Acceptable responses include, but are not limited to:

$$5550 \text{ kJ}$$

$$5.5 \times 10^3 \text{ kJ}$$

72 [1] Allow 1 credit.

**Examples of 1-credit responses:**



73 [1] Allow 1 credit for 4 *or* four.

74 [1] Allow 1 credit for 1 *or* one.

75 [1] Allow 1 credit for a temperature value below 64°C.

76 [1] Allow 1 credit for *D* *or* He.

77 [1] Allow 1 credit for 0.20 mol. Significant figures do *not* need to be shown.

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

substitution

bromination

halogenation

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

Ozone is better to use because it is safer than bromomethane.

O<sub>3</sub> is more environmentally friendly.

- 80** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- natural transmutation
  - transmutation
  - beta decay
  - radioactive decay
- 81** [1] Allow 1 credit for 28 650 y. Significant figures do *not* need to be shown.
- 82** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- A C-13 atom has seven neutrons and a C-12 atom has six neutrons.
  - An atom of C-13 and an atom of C-12 have different numbers of neutrons.
  - The number of neutrons is different.

## Regents Examination in Physical Setting/Chemistry

June 2007

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

**The *Chart for Determining the Final Examination Score for the June 2007 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Wednesday, June 20, 2007. 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.**

### Submitting 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](http://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

<b>June 2007 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		42, 43, 51, 52, 56, 63	66, 77
Math Key Idea 2		53	64, 74, 75
Math Key Idea 3		55, 58, 60, 62, 63	66, 71, 77, 81
Science Inquiry Key Idea 1		37, 62	68
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3		36, 48, 49, 60	67, 73, 76
Engineering Design Key Idea 1			
<b>Standard 2</b>			
Key Idea 1			
Key Idea 2			
<b>Standard 6</b>			
Key Idea 1			72
Key Idea 2			69
Key Idea 3			
Key Idea 4		44	
Key Idea 5			
<b>Standard 7</b>			
Key Idea 1			79
Key Idea 2			
<b>Standard 4 Process Skills</b>			
Key Idea 3		31, 32, 33, 34, 35, 38, 39, 40, 43, 44, 45, 46, 47, 48, 49, 54, 59	64, 66, 67, 68, 69, 72, 73, 74, 75, 76, 77, 78, 80, 82
Key Idea 4		50, 56, 57, 58, 61	70, 81
Key Idea 5		41	65
<b>Standard 4</b>			
Key Idea 3	1, 2, 3, 4, 5, 6, 7, 13, 14, 15, 16, 17, 19, 20, 22, 23, 24, 25, 26, 28	31, 32, 33, 34, 36, 37, 38, 39, 42, 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 59, 60, 63	64, 66, 67, 68, 69, 72, 73, 74, 75, 76, 77, 78, 82
Key Idea 4	12, 18, 27, 29	50, 57, 58, 61	70, 71, 80, 81
Key Idea 5	8, 9, 10, 11, 21, 30	35, 40, 41, 62	65, 79
<b>Reference Tables</b>			
2002 Edition	2, 5, 6, 9, 13, 18, 19, 21, 27	31, 34, 36, 40, 42, 43, 45, 46, 47, 48, 49, 55, 56, 58, 60, 61, 62, 63	66, 67, 68, 71, 72, 73, 74, 75, 76, 77, 81, 82