FOR TEACHERS ONLY

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

PS–CH PHYSICAL SETTING/CHEMISTRY

Wednesday, August 13, 2008 — 12:30 to 3:30 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

1	4	11	2	21	2		
2	3	12	3	22	1		
3	1	13	4	23	2		
4	2	14	4	24	3		
5	1	15	3	25	1		
6	4	16	4	26	1		
7	4	17	1	27	4		
8	1	18	3	28	3		
9	2	19	2	29	3		
10	1	20	3	30	4		

Part B–1

31	2	41	1
32	1	42	1
33	2	43	4
34	4	44	3
35	2	45	4
36	1	46	3
37	3	47	2
38	2	48	4
39	3	49	3
40	2	50	3

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, August 13, 2008. 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 18 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:

Cl^-

sulfate

carbonate ion

any halide

sulfide

OH^-

CrO_4^{2-}

PO_4^{3-}

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

Place the sample on a solid surface. Strike the sample with a hammer several times to see if the sample flattens.

Try to bend the sample to change the shape.

53 [2] Allow a maximum of 2 credits, 1 credit for *each* acceptable response. Acceptable responses include, but are not limited to:

Increasing the temperature of the reaction causes the reacting particles to move faster and collide more frequently.

Increasing the concentration increases the number of particle collisions.

Increasing the surface area (solid reactant) allows a greater number of particles to collide.

Adding a catalyst provides an alternate way for the particles to react.

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

An atom of copper-63 has two fewer neutrons than an atom of copper-65.

An atom of Cu-63 has 34 neutrons and an atom of Cu-65 has 36 neutrons.

55 [1] Allow 1 credit for 29.

56 [1] Allow 1 credit for 5 *or* five.

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

$(0.6917)(62.930\text{ u}) + (0.3083)(64.928\text{ u})$

$$\frac{(69.17)(62.930) + (30.83)(64.928)}{100}$$

58 [1] Allow 1 credit for 79°C ± 1°C. Significant figures do *not* need to be shown.

59 [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:

$$\frac{65.0\text{ g}}{}\left|\frac{838\text{ J}}{1\text{ g}}\right.$$

$(65)(838)$

- Allow 1 credit for 5.45×10^4 J *or* 54 500 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.

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

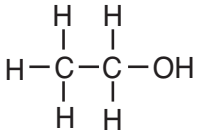
esterification

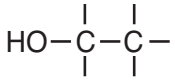
dehydration synthesis

61 [1] Allow 1 credit for $C_6H_{12}O_2$. The order of the elements can vary.

62 [1] Allow 1 credit.

Examples of 1-credit responses:





63 [1] Allow 1 credit for ____Mg(s) + __2__HCl(aq) → _____$MgCl_2$(aq) + _____H_2(g).

Allow credit even if the coefficient "1" is written in front of Mg(s), $MgCl_2$(aq), and/or H_2(g).

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

nonpolar covalent bond

covalent bond

nonpolar

65 [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:

$$V_2 = \frac{(99.5\text{ kPa})(45.6\text{ mL})(273\text{ K})}{(293\text{ K})(101.3\text{ kPa})}$$

$$\frac{(99.5)(45.6)}{293} = \frac{(101.3)x}{273}$$

- Allow 1 credit for 41.7 mL *or* for a response consistent with the student's numerical setup. Significant figures do *not* need to be shown.

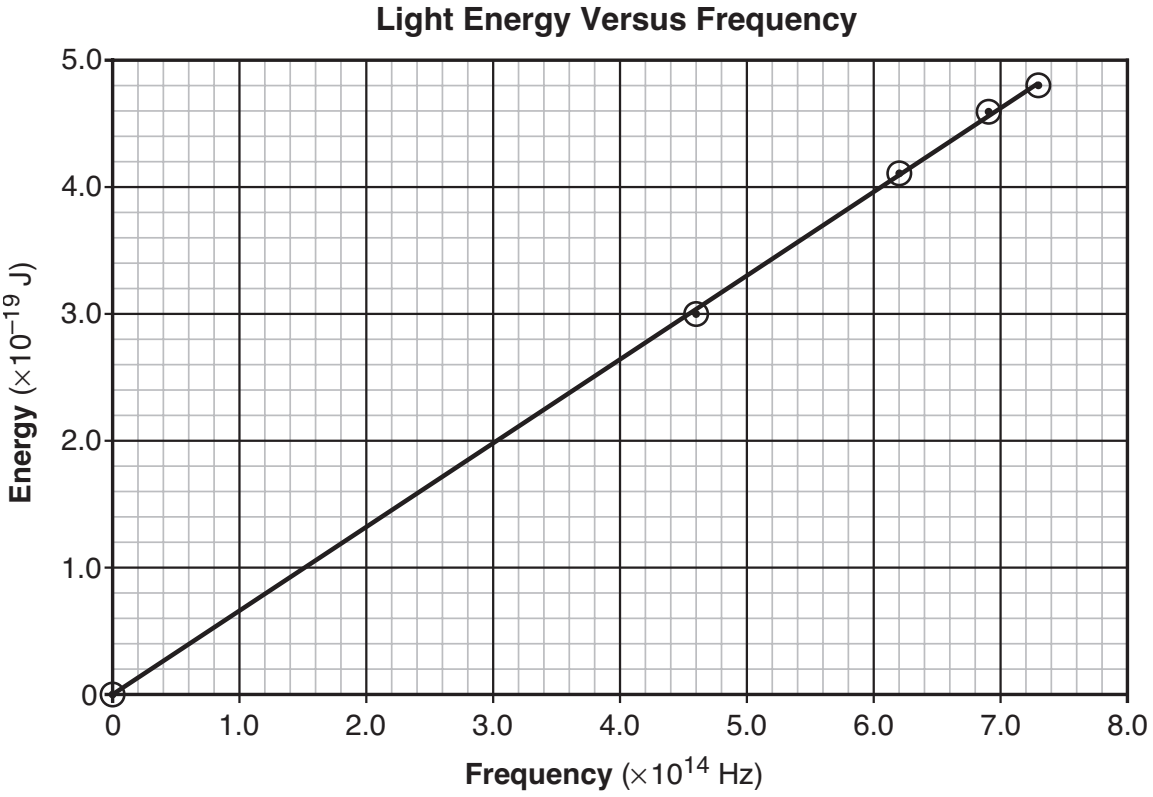
Note: Do *not* allow credit for a numerical setup and calculated result that are not related to the concept assessed by the question.

Part C

Allow a total of 17 credits for this part. The student must answer all questions in this part.

66 [1] Allow 1 credit for plotting all four points correctly ± 0.3 grid space. Plotted points do *not* need to be circled or connected.

Example of a 1-credit response:



67 [1] Allow 1 credit for 1.5×10^{-19} J ± 0.1×10^{-19} J *or* for a response consistent with the student's graph.

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

When the electron in a hydrogen atom moves from a higher energy state to a lower energy state, a specific amount of energy is emitted.

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

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

high temperature

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

In graphite, the electrons in the bonds between carbon atoms in different layers are only loosely held, but in diamond all of the electrons in the bonds are strongly held.

Graphite has electrons that can move more freely than the electrons in diamond.

71 [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:

$$V = \frac{m}{d} = \frac{0.200\text{ g}}{3.51\text{ g/cm}^3}$$

$$\frac{0.200\text{ g} \mid 1\text{ cm}^3}{\quad\quad\mid 3.51\text{ g}}$$

$$\frac{0.2}{3.51}$$

- Allow 1 credit for 0.0570 cm^3 *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.

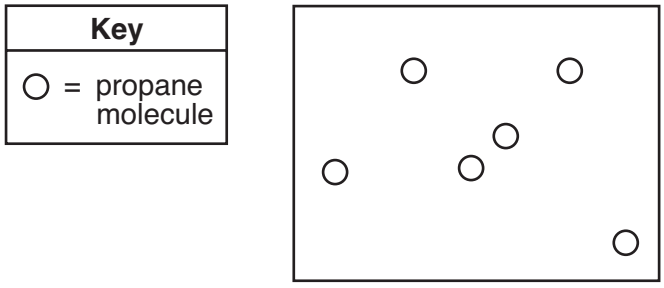
72 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The boiling point of O_3 is 161 K, and the boiling point of O_2 is 90 K. Therefore, intermolecular forces between O_3 molecules are stronger than between O_2 molecules.

The intermolecular forces between oxygen molecules are weaker than those between molecules of ozone.

73 [1] Allow 1 credit for a diagram with *at least six* molecules drawn far apart and in a random arrangement.

Example of a 1-credit response:



74 [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:

  mass = (number of moles) (gram molecular mass)

  $= (5.0 \text{ mol})\big((3)(12 \text{ g/mol}) + (8)(1 \text{ g/mol})\big)$

  $5.0 \text{ mol} \times \frac{44 \text{ g}}{1.0 \text{ mol}}$

  $(5)(44)$

- Allow 1 credit for 220 g *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.

75 [1] Allow 1 credit for 15 mol.

76 [1] Allow 1 credit for $Y(OH)_3$.

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

$$\frac{0.055 \text{ g}}{250. \text{ g}} \times 100$$

$$\frac{0.055}{250} \times 100$$

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

Energy flows from the skin to the surroundings.

Heat is transferred from the skin to the water in sweat.

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

Charged particles are free to move when salts dissolve in water.

The ions in the salts dissociate and are free to move.

The salts form aqueous solutions that can conduct electric current.

80 [1] Allow 1 credit.

Examples of 1-credit responses:

Na^+

$[K]^+$

Note: Do *not* accept a response that has dots around the element symbol.

Regents Examination in Physical Setting/Chemistry

August 2008

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

The *Chart for Determining the Final Examination Score for the August 2008 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Wednesday, August 13, 2008. 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.
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.

August 2008 Physical Setting/Chemistry			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		37, 43, 47, 56, 57, 59, 65	66, 67, 71, 73, 74, 76, 77
Math Key Idea 2		36, 43	
Math Key Idea 3		35, 47, 49, 59, 63, 65	71, 74, 75, 76
Science Inquiry Key Idea 1		53	68, 70, 72
Science Inquiry Key Idea 2		52	
Science Inquiry Key Idea 3		31, 32, 33, 41, 42, 43, 45, 46, 51, 58, 60, 61, 62	76, 79
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1		51	68
Key Idea 2			
Standard 6			
Key Idea 1			78
Key Idea 2			69, 73
Key Idea 3			
Key Idea 4			
Key Idea 5			
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		31, 32, 33, 34, 37, 38, 39, 40, 45, 47, 53, 54, 55, 57, 60, 62, 63, 65	73, 74, 75, 77
Key Idea 4		44, 48, 49, 50, 59	
Key Idea 5		64	72, 80
Standard 4			
Key Idea 3	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29	31, 32, 33, 34, 35, 38, 39, 40, 41, 42, 43, 45, 46, 47, 51, 52, 53, 54, 55, 56, 57, 60, 61, 62, 63, 65	66, 67, 68, 69, 71, 73, 74, 75, 76, 77, 79
Key Idea 4	28, 30	37, 44, 48, 49, 50, 58, 59	78
Key Idea 5	10, 12, 13, 18	36, 64	70, 72, 80
ESRT 2001 Edition (Revised)	3, 4, 5, 6, 7, 8, 9, 10, 15, 19, 21, 25	31, 32, 33, 35, 36, 37, 39, 41, 43, 47, 48, 51, 55, 58, 59, 61, 62, 64, 65	69, 71, 72, 74, 76, 77, 80