

# FOR TEACHERS ONLY

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

## PS-CH PHYSICAL SETTING/CHEMISTRY

Tuesday, August 13, 2002 — 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.

**Part A and Part B-1**  
**Allow 1 credit for each correct response.**

Part A			Part B-1	
1 . . . . . <b>2</b> . . . . .	11 . . . . . <b>1</b> . . . . .	21 . . . . . <b>4</b> . . . . .	31 . . . . . <b>3</b> . . . . .	41 . . . . . <b>1</b> . . . . .
2 . . . . . <b>3</b> . . . . .	12 . . . . . <b>4</b> . . . . .	22 . . . . . <b>3</b> . . . . .	32 . . . . . <b>4</b> . . . . .	42 . . . . . <b>4</b> . . . . .
3 . . . . . <b>1</b> . . . . .	13 . . . . . <b>2</b> . . . . .	23 . . . . . <b>2</b> . . . . .	33 . . . . . <b>1</b> . . . . .	43 . . . . . <b>4</b> . . . . .
4 . . . . . <b>2</b> . . . . .	14 . . . . . <b>3</b> . . . . .	24 . . . . . <b>1</b> . . . . .	34 . . . . . <b>2</b> . . . . .	44 . . . . . <b>4</b> . . . . .
5 . . . . . <b>3</b> . . . . .	15 . . . . . <b>3</b> . . . . .	25 . . . . . <b>2</b> . . . . .	35 . . . . . <b>2</b> . . . . .	45 . . . . . <b>2</b> . . . . .
6 . . . . . <b>4</b> . . . . .	16 . . . . . <b>2</b> . . . . .	26 . . . . . <b>4</b> . . . . .	36 . . . . . <b>2</b> . . . . .	46 . . . . . <b>3</b> . . . . .
7 . . . . . <b>1</b> . . . . .	17 . . . . . <b>2</b> . . . . .	27 . . . . . <b>1</b> . . . . .	37 . . . . . <b>4</b> . . . . .	47 . . . . . <b>2</b> . . . . .
8 . . . . . <b>3</b> . . . . .	18 . . . . . <b>1</b> . . . . .	28 . . . . . <b>1</b> . . . . .	38 . . . . . <b>3</b> . . . . .	48 . . . . . <b>2</b> . . . . .
9 . . . . . <b>1</b> . . . . .	19 . . . . . <b>4</b> . . . . .	29 . . . . . <b>3</b> . . . . .	39 . . . . . <b>2</b> . . . . .	49 . . . . . <b>3</b> . . . . .
10 . . . . . <b>1</b> . . . . .	20 . . . . . <b>3</b> . . . . .	30 . . . . . <b>2</b> . . . . .	40 . . . . . <b>3</b> . . . . .	50 . . . . . <b>1</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 Administering and 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 checkmark 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 printed at the end of this Scoring Key and Rating Guide. 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.

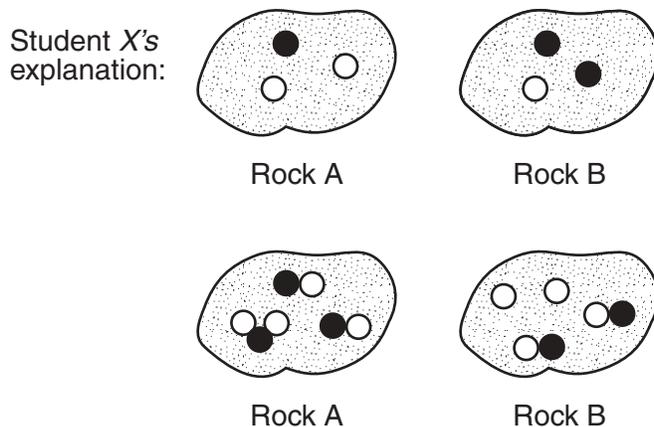
All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions 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 in the scoring key for that administration be used to determine the student's final score. The chart in this scoring key is usable only for this administration of the examination.

**Part B–2**

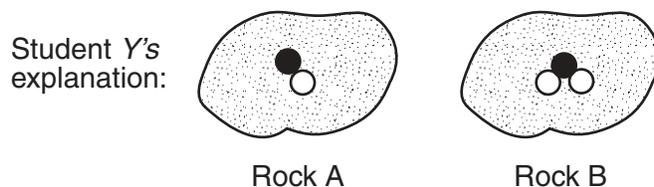
**Allow a total of 15 credits for this part. The student must answer all questions in this part.**

- 51** [2] Allow 1 credit for a correct diagram of Student X's explanation in which Rock B shows a different mix of nontouching atoms of Pb and S than Rock A shows or a mix of correctly drawn compounds of PbS (○●) and PbS<sub>2</sub> (○●○) or a mix of element(s) and compound(s) of Pb and S. Acceptable responses include, but are not limited to, these examples:



*and*

Allow 1 credit for a correct diagram of Student Y's explanation in which Rock A and Rock B show two different combinations of Pb and S atoms touching or connecting. Acceptable responses include, but are not limited to, this example:



- 52** [2] Allow 1 credit for a correct response for K.

*and*

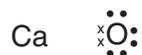
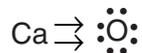
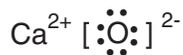
Allow 1 credit for a correct response for Na.

Acceptable responses include, but are not limited to, these examples:

$K^{1+}$  has three energy levels, while  $Na^{1+}$  has only two energy levels.

$Na^+$  has its valence electrons drawn closer to the nucleus than  $K^+$  because the effect of the nucleus is greater for  $Na^+$ .

- 53 [3] **a** Allow 1 credit for a correctly drawn diagram. The number of dots in the diagram drawn must be correct. Charges are necessary *only* if electron transfer is *not* clearly shown. Acceptable responses include, but are not limited to, these examples:

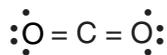


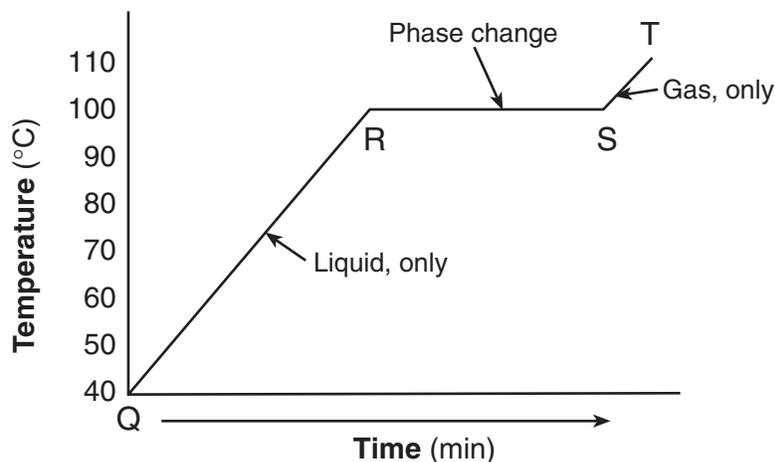
**Note:** Do *not* deduct for missing brackets.

- b** Allow 1 credit for a correctly drawn diagram. The number of dots in the diagram drawn must be correct. Acceptable responses include, but are not limited to, these examples:



- c** Allow 1 credit for a correctly drawn diagram. The number of dots in the diagram drawn must be correct. Acceptable responses include, but are not limited to, these examples:



54 [3] *a*

Allow 1 credit for correctly labeling all three regions.

**b** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

The water molecules acquire more kinetic energy.

Heat is converted to kinetic energy of the water molecules.

The water molecules speed up or increase their relative motion.

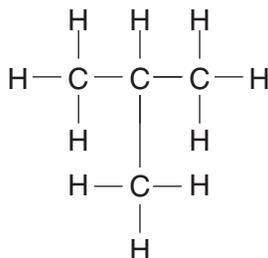
**c** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

The potential energy of the water molecules increases.

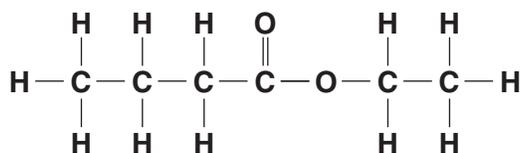
The water molecules change from the liquid phase to the gas phase.

There is less attraction between the H<sub>2</sub>O molecules.

55 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:



- 56 [2] **a** Allow 1 credit for



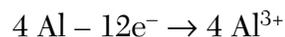
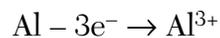
**Note:** Mirror images of the above structural formula are acceptable.

- b** Allow 1 credit for **116** or **116 g**.

*or*

Allow 1 credit for any numerically correct value that is consistent with the student's drawing in part *a*.

- 57 [2] **a** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:



- b** Allow 1 credit for **-2**.

**Part C**

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

- 58** [3] **a** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

less air pollution

low cost

conservation of fossil fuels

more energy produced

- b** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

nuclear meltdown

biological risks (cancer, mutations)

contamination of the environment

radiation exposure

lack of storage facilities for spent fuel rods

radiation emitted

- c** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Sr-90 is radioactive and might cause tissue damage to the animal.

Sr-90 emits beta particles.

Bones become radioactive.

- 59 [6] **a** Allow 1 credit for **KCl**, **Ba(OH)<sub>2</sub>**, and **CH<sub>3</sub>COOH**. All three solutions must be correct to receive credit.

**b** Allow 1 credit for **CH<sub>3</sub>COOH**.

- c** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

They yield H<sup>+</sup>(H<sub>3</sub>O<sup>+</sup>) in solution.

They are acids.

[H<sup>+</sup>] > [OH<sup>-</sup>]

**d** Allow 1 credit for **Ba(OH)<sub>2</sub>**.

**e** Allow 1 credit for **Ba(OH)<sub>2</sub>**.

*and*

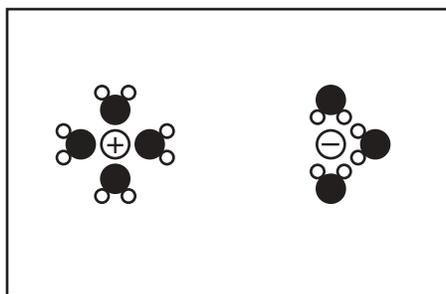
Allow 1 credit for an appropriate explanation. Acceptable responses include, but are not limited to, these examples:

It has the greatest number of particles dissolved.

It dissociates into the greatest number of particles.

It has the highest van't Hoff factor (*i*).

- 60 [3] **a**



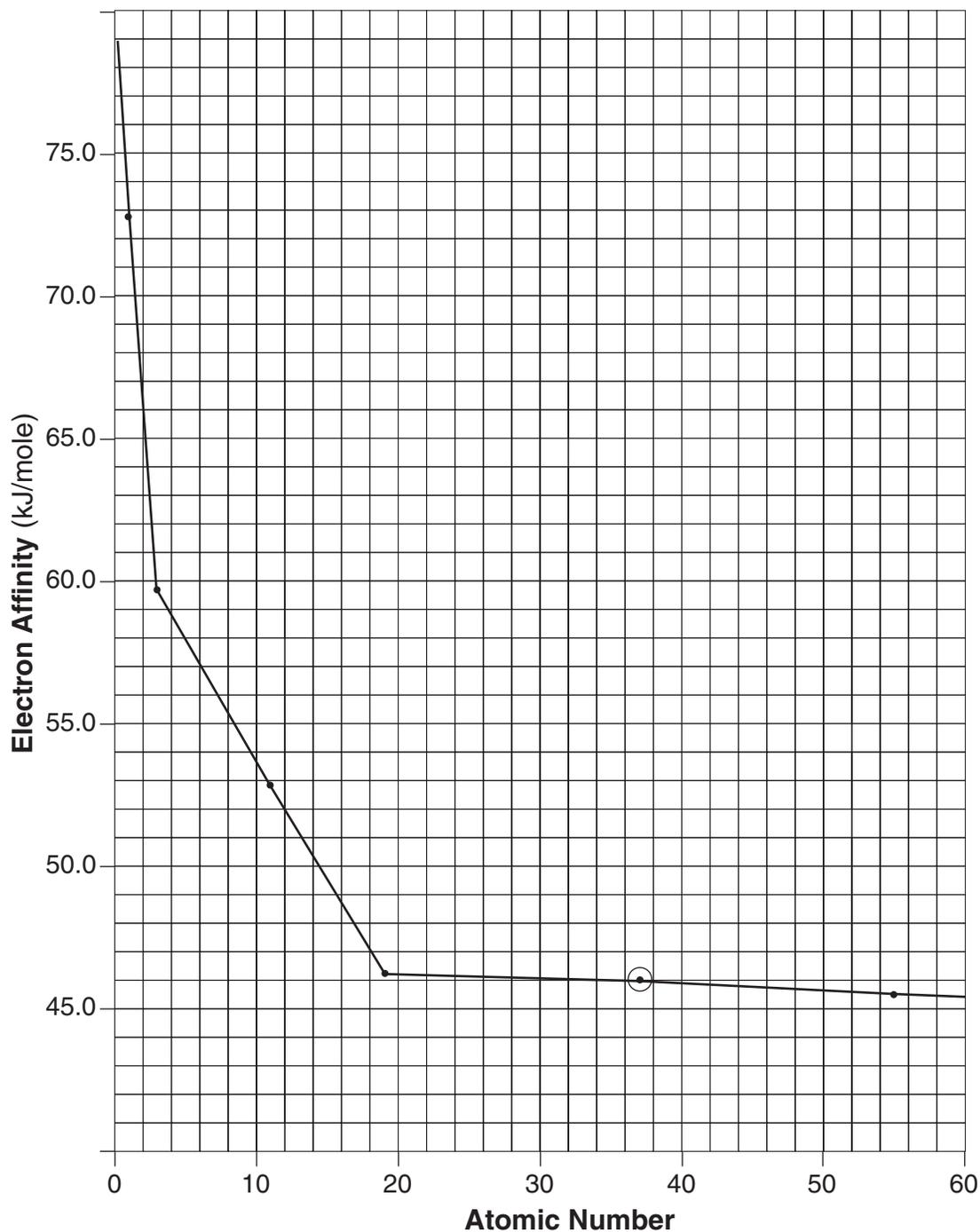
Allow 1 credit for showing that the ions are separated.

*and*

Allow 1 credit for showing water molecules around each ion with the proper orientation.

**b** Allow 1 credit for a response that states that the **rates are equal**.

61 [3]



*a* Allow 1 credit if *both* axes are labeled and also have an appropriate scale.

*b* Allow 1 credit for an acceptable plot of curve.

*c* Allow 1 credit if the response is in the range of 45.6 to 46.3.

*or*

Allow 1 credit for a response that is consistent with the student's graph in parts *a* and *b*.

**Note:** Allow credit if the student uses whole numbers rather than tenths.

- 62** [5] **a** Allow 1 credit for a correct setup. Acceptable responses include, but are not limited to, these examples:

$$\frac{10.23}{21.5 - 20.0} = 6.8$$

$$\frac{10.23}{1.5} = 6.8$$

$$\frac{10.23 \text{ g}}{1.5 \text{ mL}} = 6.8 \text{ g/mL}$$

*and*

Allow 1 credit for the appropriate number of significant figures, to the nearest tenth. Accept answers in the range of 6.7–6.9 or for a response that is consistent with the student's setup.

*and*

Allow 1 credit for the proper units. Acceptable responses include, but are not limited to, these examples:

g/mL

grams per milliliter

- b** Allow 1 credit for a response in the range of 1.8 to 2.0%. The negative sign is *not* necessary.

*or*

Allow 1 credit for a response that is consistent with the student's value in part *a*.

- c** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:

The density would increase because the sample was wet when weighed.







**Regents Examination in Physical Setting/Chemistry**  
**August 2002**  
**Chart for Converting Total Test Raw Scores to**  
**Final Examination Scores (Scaled Scores)**

<b>Raw Score</b>	<b>Scaled Score</b>						
85	100	63	72	41	59	19	39
84	98	62	71	40	58	18	38
83	96	61	70	39	58	17	36
82	94	60	70	38	57	16	35
81	93	59	69	37	57	15	33
80	91	58	68	36	56	14	32
79	90	57	68	35	55	13	30
78	88	56	67	34	55	12	28
77	87	55	67	33	54	11	26
76	85	54	66	32	53	10	24
75	84	53	65	31	52	9	22
74	83	52	65	30	51	8	20
73	81	51	64	29	51	7	18
72	80	50	64	28	50	6	16
71	79	49	63	27	49	5	13
70	78	48	63	26	48	4	11
69	77	47	62	25	47	3	8
68	76	46	62	24	46	2	6
67	75	45	61	23	44	1	3
66	74	44	61	22	43	0	0
65	73	43	60	21	42		
64	73	42	60	20	41		

To determine the student's final examination score, find the student's total test raw score in the column labeled "Raw Score" and then locate the scaled score that corresponds to that raw score. The scaled score is the student's final examination score. Enter this score in the space labeled "Final Score" on the student's answer sheet.

## Map to Core Curriculum

<b>August 2002 Physical Setting/ Chemistry</b>			
<b>Question Numbers</b>			
Key Ideas	Part A	Part B	Part C
<b>Standard 1</b>			
Math Key Idea 1		36	61,62
Math Key Idea 2			61
Math Key Idea 3			62
Sci. Inq. Key Idea 1			60
Sci. Inq. Key Idea 2			
Sci. Inq. Key Idea 3			
Eng. Des. Key Idea 1			
<b>Standard 2</b>			
Key Idea 1		35,40,44,50	
Key Idea 2			
<b>Standard 6</b>			
Key Idea 1			
Key Idea 2			60,62
Key Idea 3			
Key Idea 4			
Key Idea 5			61
<b>Standard 7</b>			
Key Idea 1			
Key Idea 2			
<b>Standard 4 Process Skills</b>			
Key Idea 3		31,32,37,38,45, 46,47,48,49,51, 52,55,56,57,	59,60
Key Idea 4		34,36,39,41,42, 43,54	58
Key Idea 5		33,53	
<b>Standard 4</b>			
Key Idea 3	1,2,3,4,6,7,9, 13,15,16,18,19, 20,22,23,25,26, 27,29	31,32,36,37,38, 39,40,42,45,46, 47,48,49,50,51, 55,56,57	59,60,61,62
Key Idea 4	5,8,14,24	34,35,41,43,54	58
Key Idea 5	10,11,12,17,21, 28,30	33,44,52,53	
<b>Reference Tables</b>			
2002 Edition	2,3,4,8,10,11, 12,14,15,17,19, 25,27	35,36,40,43,44, 45,46,48,49,50, 52,56	59