

FOR TEACHERS ONLY

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

PS-CH

PHYSICAL SETTING/CHEMISTRY

Wednesday, January 29, 2003 — 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 3 before rating student papers.

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

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

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.

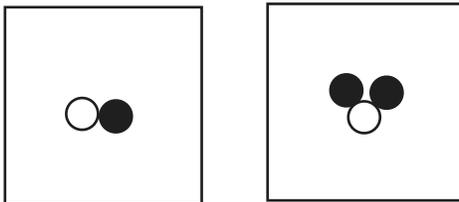
All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions 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

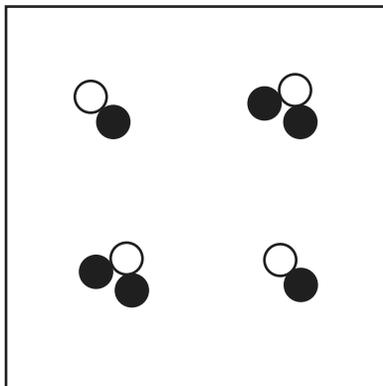
Allow a total of 14 credits for this part. The student must answer all questions in this part.

- 51 [2] **a** Allow 1 credit for correctly drawing two different compounds. At least *two* different particles must be touching in each drawing and there must be different combinations drawn of touching atoms. Acceptable responses include, but are not limited to, these examples:



Note: No specific bond angle is necessary.

- b** Allow 1 credit for correctly drawing a mixture of the *two* kinds of particles drawn in part *a*. There must be at least *one* drawing of *each* particle. Acceptable responses include, but are not limited to, this example:



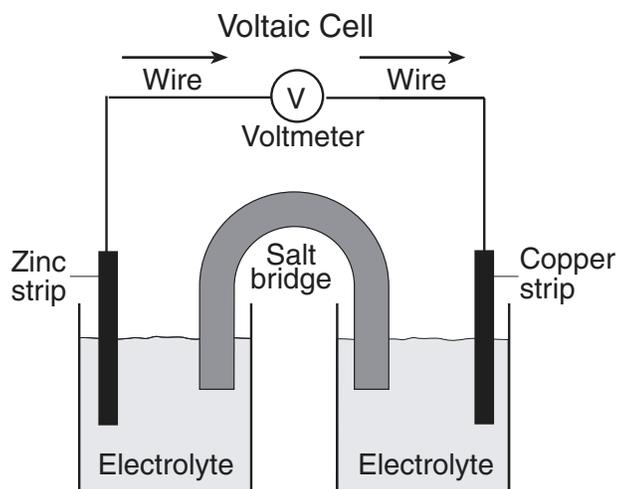
- 52 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Lower the temperature to condense ammonia.

Place all three gases in water. Ammonia will dissolve (is soluble).

distillation

53 [1]



Allow 1 credit for a correct response. All arrows must be drawn in the correct direction from zinc toward copper through the wire.

54 [1] Allow 1 credit for $\text{Zn}^0 \rightarrow \text{Zn}^{2+} + 2\text{e}^-$ or $\text{Zn}^0 - 2\text{e}^- \rightarrow \text{Zn}^{2+}$. Zn instead of Zn^0 is acceptable. Indicating states is acceptable but not required for credit.

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

- migration of ions
- maintains neutrality
- prevents polarization

56 [3] **a** Allow 1 credit for **fission**.

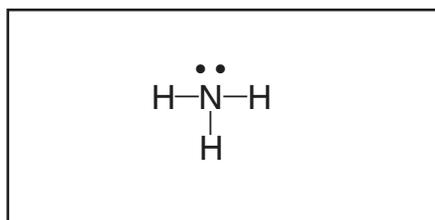
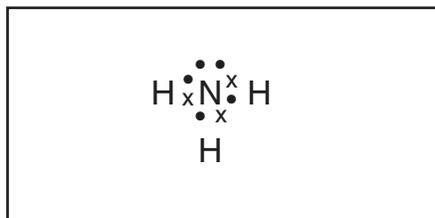
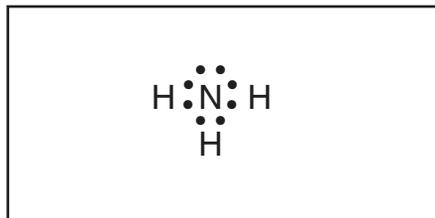
b Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:

The mass is converted to energy.

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

- fusion
- nuclear decay
- radioactive decay
- natural transmutation

- 57 [1] Allow 1 credit for a correct response. Pairs of dots and/or Xs or single dashes are acceptable for any shared pair. Acceptable responses include, but are not limited to, these examples:



Note: Accept a correct structure in any rotational orientation.

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

The molecule is symmetrical in shape and/or charge.

Electrons are evenly distributed.

All polar covalent dipoles cancel — no dipole moments.

no dipoles

- 59 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

NH_3 has polar molecules that attract each other.

NH_3 has an unshared pair of electrons around the center atom.

NH_3 is capable of hydrogen bonding.

unequal distribution of electrons — in strong attraction

- 60** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

KCl — ionic bond; A, B, C — no ionic bonds

Atoms do not share electrons when bonding.

There is a transfer of electrons from K to Cl.

KCl forms by electrostatic attraction.

Bonding involves a metal with a nonmetal.

- 61** [1] Allow 1 credit for a correct response that refers to both saturated and unsaturated compounds. Acceptable responses include, but are not limited to, these examples:

Unsaturated hydrocarbons — double or triple bonds (multiple bonds) and saturated hydrocarbons — all single bonds

An unsaturated hydrocarbon has at least one multiple covalent bond between carbon atoms, and a saturated hydrocarbon has single covalent bonds between carbon atoms.

Unsaturated hydrocarbons have more than one shared pair of electrons between carbon atoms, and saturated hydrocarbons have only one shared pair of electrons between carbon atoms.

Part C

Allow a total of 21 credits for this part. The student must answer all questions in this part.

- 62** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- The atom is mostly empty space.
- The volume of the atom is mostly unoccupied.
- 63** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- Alpha particles were deflected by the positively charged nucleus.
- nucleus — charged
- 64** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- The atom has a positively charged nucleus; negative electrons surround the outside.
- The positive charges are in the nucleus; electrons are not mixed in the nucleus.
- nucleus smaller than atom
- 65** [1] Allow 1 credit for a correct response. A reference to solubility and pressure must be in the answer. Acceptable responses include, but are not limited to, this example:
- Solubility of $\text{CO}_2(\text{g})$ decreases with a decrease in pressure.

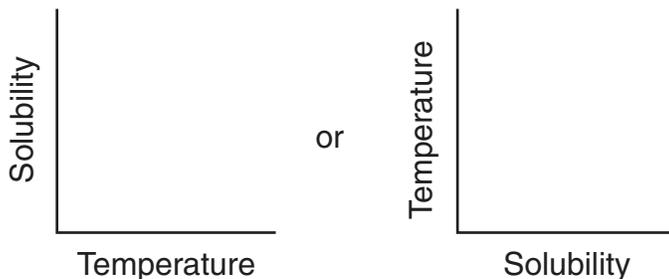
Note: Do *not* allow credit for “Soda goes flat.”

- 66 [1] Allow 1 credit for a correct response. A reference to solubility and temperature must be in the answer. Acceptable responses include, but are not limited to, this example:

Solubility decreases as temperature increases.

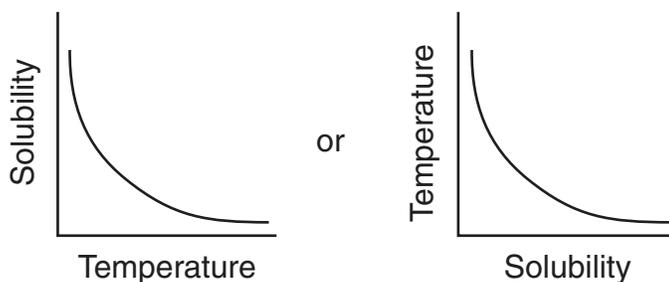
Note: Do *not* allow credit for “Soda goes flat.”

- 67 [2] *a*



Allow 1 credit for a correctly drawn and labeled set of axes.

b



Allow 1 credit for a line that starts toward the top of the *y*-axis and goes downward toward the right end of the *x*-axis.

Note: Assume the origin to be zero unless otherwise labeled.

- 68 [2] Allow 1 credit for **710** (± 10).

and

Allow 1 credit for **mm Hg** as the unit.

- 69 [2] Allow 1 credit for **114** (± 2).

and

Allow 1 credit for **°C** as the unit.

- 70 [2] Allow 1 credit for liquid **A**.

and

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

The higher vapor pressure of liquid A indicates that the intermolecular forces between its molecules are weaker, allowing the molecules to escape more readily to the vapor phase.

- 71 [2] Allow 1 credit for **12** mL or **12.0** mL.

and

Allow 1 credit if the setup is correct, but a computational error is made.

- 72 [2] Allow 1 credit for **phenolphthalein** or **bromthymol blue** or **litmus**.

and

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

Strong acid and strong base reach an end point at pH = 7.

Phenolphthalein goes from colorless to pink after pH = 7.

Bromthymol blue (or litmus) reaches an intermediate color around pH = 7.

- 73 [3] Allow 1 credit for **1.01** or **1.0** or **1**.

and

Allow 1 credit for two significant figures consistent with the student's calculated answer.

and

Allow 1 credit for **M** or **moles per liter** or an equivalent as the unit.

- 74 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Multiple trials help to cancel out experimental error in each trial.

Each trial involves errors either above or below the true value. Therefore, the average value would contain the least error.

Multiple trials ensure better accuracy of results.

to correct for inconsistencies between trials (in measurement)

Regents Examination in Physical Setting/Chemistry
January 2003
Chart for Converting Total Test Raw Scores to
Final Examination Scores (Scaled Scores)

Raw Score	Scaled Score						
85	100	63	74	41	60	19	39
84	98	62	73	40	60	18	38
83	97	61	72	39	59	17	36
82	95	60	72	38	58	16	35
81	93	59	71	37	57	15	33
80	92	58	70	36	57	14	31
79	91	57	70	35	56	13	30
78	89	56	69	34	55	12	28
77	88	55	68	33	54	11	26
76	87	54	68	32	54	10	24
75	85	53	67	31	53	9	22
74	84	52	67	30	52	8	20
73	83	51	66	29	51	7	18
72	82	50	66	28	50	6	15
71	81	49	65	27	49	5	13
70	80	48	64	26	48	4	11
69	79	47	64	25	47	3	8
68	78	46	63	24	46	2	5
67	77	45	63	23	44	1	3
66	76	44	62	22	43	0	0
65	75	43	61	21	42		
64	75	42	61	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

January 2003 Physical Setting/ Chemistry			
Question Numbers			
Key Ideas	Part A	Part B	Part C
Standard 1			
Math Key Idea 1	8,22	43	71,73
Math Key Idea 2			67
Math Key Idea 3			
Sci. Inq. Key Idea 1		51,57,58,59	62,63,64
Sci. Inq. Key Idea 2			
Sci. Inq. Key Idea 3		39,40	68,69,71,74
Eng. Des. Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2			
Standard 6			
Key Idea 1			
Key Idea 2		45	
Key Idea 3			
Key Idea 4		50	
Key Idea 5		38,47	
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		33,34,36,37,40,41, 42,44,45,46,48,49, 50,51,52,53,54,55, 56a,61	65,66,71,72,73
Key Idea 4		31,32,38,47,56c	
Key Idea 5		35,39,56b,57,59,60	70
Standard 4			
Key Idea 3	1,2,3,4,5,7,8,9,11,13, 16,18,19,21,22,23,24, 25,26,27,28,30	32,34,36,37,40,41, 42,44,45,46,48,49, 50,51,52,53,61	62,63,64,65,66, 67,71,72,73,74
Key Idea 4	12,17,20	31,33,38,47,56a, 56c	
Key Idea 5	6,10,14,15,29	35,39,56b,57,58, 59,60	68,69,70
Reference Tables			
2002 Edition	3,4,6,7,20	31,37,44,45,46,53	72