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ERRATA SHEET

Notice to Teachers

Physical Setting/Chemistry Regents Examination Scoring Key and Rating Guide

Friday, June 21, 2002—1:15 p.m.

This information pertains to the scoring of questions 39, 70, 71, 73, and 74 of the June 2002 Physical Setting/Chemistry Regents Examination. In addition to the answers provided in the Scoring Key and Rating Guide, credit may also be awarded as described below:

- For question 39, students who selected choice 4 should be given credit. Students who selected choice 1, the correct answer provided in the Scoring Key, should also be given credit.
- If a student mistakenly provided a correct oxidation half-reaction for question 70 and a correct reduction half-reaction for question 71, the student should be given no credit for question 70 but should be awarded one credit for question 71.
- Acceptable answers to question 73 include, but are not limited to, those listed in the Rating Guide and those listed below:
 - Zinc (*not* zinc ion) loses electrons and chromium ion (*not* chromium) gains electrons.
 - The species being oxidized loses electrons and the species being reduced gains electrons
 - Answers equivalent to the examples above.
- Allow credit for responses to question 74 that are consistent with those given in the Rating Guide or for a response that is consistent with the student's response to question 70.

Please communicate this information to all persons responsible for hand or machine-scoring the student answer sheets.

FOR TEACHERS ONLY

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

PS-CH

PHYSICAL SETTING/CHEMISTRY

Friday, June 21, 2002 — 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.

Part A and Part B-1

Allow 1 credit for each correct response.

Part A			Part B-1	
1 4	11 4	21 4	31 2	41 3
2 2	12 3	22 4	32 4	42 1
3 3	13 2	23 4	33 2	43 2
4 3	14 1	24 2	34 4	44 2
5 1	15 1	25 1	35 1	45 1
6 3	16 3	26 3	36 1	46 3
7 4	17 1	27 2	37 4	47 3
8 2	18 1	28 2	38 3	48 1
9 4	19 4	29 3	39 1	49 2
10 2	20 1	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 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 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:

Ca:

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

$:\ddot{\text{Cl}}:$

- 53 [2] Allow 2 credits for a correct response. Acceptable responses include, but are not limited to, these examples:

$[\text{Ca}]^{2+}$ and $[\ddot{\text{Cl}}:]^{-}$ and $[\ddot{\text{Cl}}:]^{-}$

$[\text{Ca}]^{2+}$ and $2[\ddot{\text{Cl}}:]^{-}$

Allow only 1 credit if one of the ion charges is incorrect or if the number of chloride ions is incorrect.

Note: Allow credit even if brackets are not present.

- 54 [4] **a** Allow 2 credits, 1 credit for *each* of two correct responses. Acceptable responses include, but are not limited to, these examples:

Test with an indicator.

Use pH paper.

Check for reactivity.

- b** Allow 2 credits, 1 credit for *each* of two correct responses. Acceptable responses include, but are not limited to, these examples:

The base will turn phenolphthalein pink; the acid will not.

The acid will turn blue litmus paper red, and the base will turn red litmus paper blue.

Bromthymol blue will turn yellow in the acid and blue in the base.

The acid will react with an active metal like magnesium; the base will not.

The acid will have a pH less than 7; the base will have a pH greater than 7.

- 55 [2] Allow 1 credit for **endothermic**.

and

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

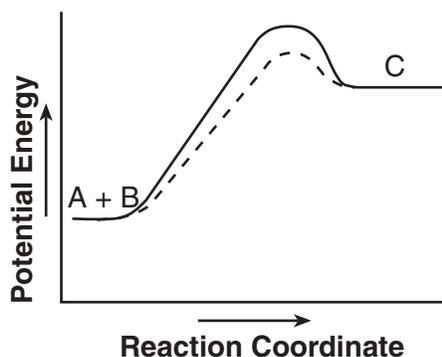
PE of product *C* is greater than PE of reactants *A* and *B*.

Product *C* absorbed energy and is at a higher PE than reactants *A* and *B*.

or

Allow 1 credit for a response that is consistent with the student's answer of exothermic.

- 56 [1]



Allow 1 credit if the student indicates that the catalyst lowers the activation energy without changing the potential energy of the reactants (*A + B*) or the product (*C*).

Note: Do *not* allow credit if the potential energy of the products or the reactants is changed.

- 57 [4] **a** Allow 1 credit for a response that indicates that the number of moles of $\text{N}_2(\text{g})$ increases or more $\text{N}_2(\text{g})$ is made.

b Allow 1 credit for a response that indicates that the number of moles of $\text{H}_2(\text{g})$ decreases, less $\text{H}_2(\text{g})$ is made, or more $\text{H}_2(\text{g})$ is consumed.

c Allow 1 credit for a response that indicates that there is no effect on the production of $\text{NH}_3(\text{g})$ or that the number of moles remains the same.

and

Allow 1 credit for a response that is consistent with the effect stated by the student. Acceptable responses include, but are not limited to, these examples:

A catalyst increases the rate of both the forward and the reverse reactions equally.

The equilibrium point is reached faster.

A catalyst does not affect the concentrations of reactants or products.

Part C

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

58 [1] Allow 1 credit for **protons and neutrons**. The response must have both protons and neutrons to receive credit.

59 [1] Allow 1 credit for a response that indicates that protons are positively charged (+) and neutrons have no charge (0). Both charges must be correct to receive credit.

or

Allow credit for a response that is consistent with the student's answer to question 58.

60 [1] Allow 1 credit for **positive** or **+**.

61 [1] Allow 1 credit for **covalent** or **molecular** or **nonpolar covalent**.

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

The intermolecular attractions between the particles of the solid are weak.
weak intermolecular attractions

63 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:
There are no freely moving charged particles.

64 [1] Allow 1 credit for **exothermic**.

- 65 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Energy flows from the injured leg to the cold pack.

Heat flows from the higher temperature (the leg) to the lower temperature (the cold pack).

The cold pack absorbs heat energy from the injured leg.

- 66 [2] Allow 1 credit for an accurate definition of the Law of Conservation of Energy. Acceptable responses include, but are not limited to, these examples:

Within all chemical interactions, energy is conserved.

Energy is conserved in all changes except nuclear reactions.

heat (energy) lost = heat (energy) gained

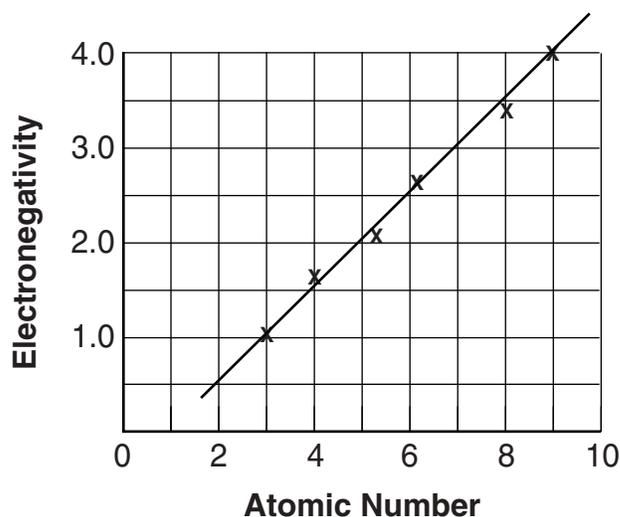
and

Allow 1 credit for an accurate explanation of how the law applies to the chemical reaction in the hot pack. Acceptable responses include, but are not limited to, these examples:

The energy released from the hot pack is equal to the energy absorbed by the surroundings.

The total energy of the system (the hot pack) is equal to the total energy of the surroundings. Everything else is constant.

- 67 [2]



Allow 1 credit for a correct *y*-axis scale.

and

Allow 1 credit if at least five of the six points are plotted and connected correctly.

- 68 [1] Allow 1 credit for **the electronegativity of nitrogen is 3.0** (± 0.2).

or

Allow 1 credit for a response that is consistent with the plotted data on the student's graph (± 0.2).

- 69 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:
Atomic number increases—electronegativity increases.
- 70 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
$$\text{Cr}^{3+} + 3\text{e}^{-} \rightarrow \text{Cr}$$
$$2 \text{Cr}^{3+} + 6\text{e}^{-} \rightarrow 2 \text{Cr}$$
- 71 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
$$\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^{-}$$
$$3 \text{Zn} \rightarrow 3 \text{Zn}^{2+} + 6\text{e}^{-}$$
$$\text{Zn} - 2\text{e}^{-} \rightarrow \text{Zn}^{2+}$$
$$3 \text{Zn} - 6\text{e}^{-} \rightarrow 3 \text{Zn}^{2+}$$
- 72 [1] Allow 1 credit for $\underline{3} \text{Zn} + \underline{2} \text{Cr}^{3+} \rightarrow \underline{3} \text{Zn}^{2+} + \underline{2} \text{Cr}$.
All coefficients must be correct to receive credit.
- 73 [1] Allow 1 credit if the response indicates that Zn (*not* Zn^{2+}) loses electrons and Cr^{3+} (*not* Cr) gains electrons. Both parts must be correct to receive credit.
- 74 [1] Allow 1 credit for $6\text{e}^{-} + 2 \text{Cr}^{3+} \rightarrow 2 \text{Cr}$ or **reduction** or **chromium half-reaction** or $\text{Cr}^{3+} + 3\text{e}^{-} \rightarrow \text{Cr}$.
- 75 [1] Allow 1 credit for a response that indicates that the number of protons remains the same or is unaffected.

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

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

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

June 2002 Physical Setting/ Chemistry			
Question Numbers			
Key Ideas	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		38,47,50	67
Math Key Idea 2			68,69
Math Key Idea 3		46	
Sci. Inq. Key Idea 1		36	
Sci. Inq. Key Idea 2		33,54	
Sci. Inq. Key Idea 3			
Eng. Des. Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2			
Standard 6			
Key Idea 1			
Key Idea 2			
Key Idea 3			
Key Idea 4		57	
Key Idea 5		39	
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		31,32,34,35,37,40, 41,42,43,44,45,48, 49,51,52,54,57	58,59,60,70,71,72
Key Idea 4		55,56	64,65,66
Key Idea 5		53	61,62,63
Standard 4			
Key Idea 3	1,2,4,5,6,7,9,12,14,15, 17,18,19,20,21,22,23, 24,25,26,30	31,32,33,34,35,36, 37,38,40,41,42,43, 44,45,48,49,51,52, 54,56,57	58,59,60,67,68, 69,70,71,72,73, 74,75
Key Idea 4	16,28,29	46,55	64,65,66
Key Idea 5	3,8,10,11,13,27	39,53	61,62,63
Reference Tables			
2002 Edition	1,3,6,7,8,10,11,13,17, 18,19,21,24,29	31,32,34,39,40,41, 46,48,51,52,53,54	58,59,60,70,71,73