FOR TEACHERS ONLY

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

PS–CH PHYSICAL SETTING/CHEMISTRY

Thursday, January 27, 2005 — 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.

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. Visit the site http://www.emsc.nysed.gov/osa/ and select the link "Latest Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and at least one more time before the final scores for the examination are recorded.

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

Part A

1	1	11	1	21	4	31	2	41	3
2	3	12	4	22	4	32	3	42	3
3	1	13	4	23	1	33	1	43	1
4	1	14	2	24	1	34	1	44	4
5	2	15	2	25	1	35	4	45	3
6	2	16	4	26	4	36	1	46	4
7	3	17	2	27	1	37	1	47	1
8	4	18	4	28	1	38	3	48	4
9	2	19	4	29	3	39	1	49	2
10	4	20	3	30	1	40	3	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 that will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Thursday, January 27, 2005. 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 a correct response. Acceptable responses include, but are not limited to, these examples:

S

sulfur

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

CO_2 is symmetrical.

CO_2 has an even distribution of charge.

CO_2 is linear with O at each end.

53 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

The electronegativity difference in a carbon-oxygen bond is greater than the electronegativity difference in a fluorine-fluorine bond.

The EN difference for C and O is 0.9 and the EN difference for F and F is 0.

54 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

remains the same

It does not change.

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

$\overline{DE}$ is longer than $\overline{BC}$.

more time to boil than to melt

56 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

C_2H_2

$C_2H_2(g)$

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

3

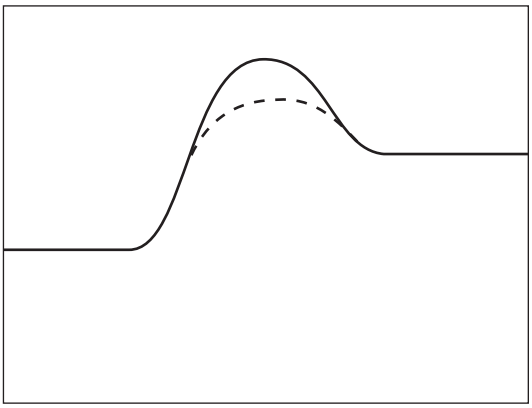
three

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

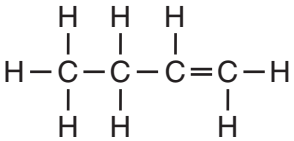
Arrow 2 gets shorter.

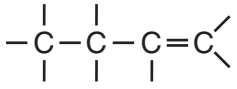
The activation energy would be lower.

The peak of the curve is lower.



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





60 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:

2-chlorobutane

61 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

ester

esters

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

alkene

alkenes

C_nH_{2n}

olefins

63 [1] Allow 1 credit for a correct numerical setup. Acceptable responses include, but are not limited to, these examples:

$\frac{(1.4)(15.40)}{22.10}$

$(1.4\text{ M})(15.40\text{ mL}) = M_B(22.10\text{ mL})$

$(1.4)(15.40) = X(22.10)$

64 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Multiple trials improve precision of results.

to see if results are repeatable

more trials, less error

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

14.46

14.5

14

Part C

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

66 [1] Allow 1 credit for a correct numerical setup. Acceptable responses include, but are not limited to, these examples:

$(12.00)(0.9893) + (13.00)(0.0107)$

$\frac{(12.00)(98.93) + (13.00)(1.07)}{100}$

67 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Carbon-12 has six neutrons and carbon-13 has seven neutrons.

Carbon-13 has one more neutron than carbon-12.

C-12 has 6n; C-13 has 7n.

68 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

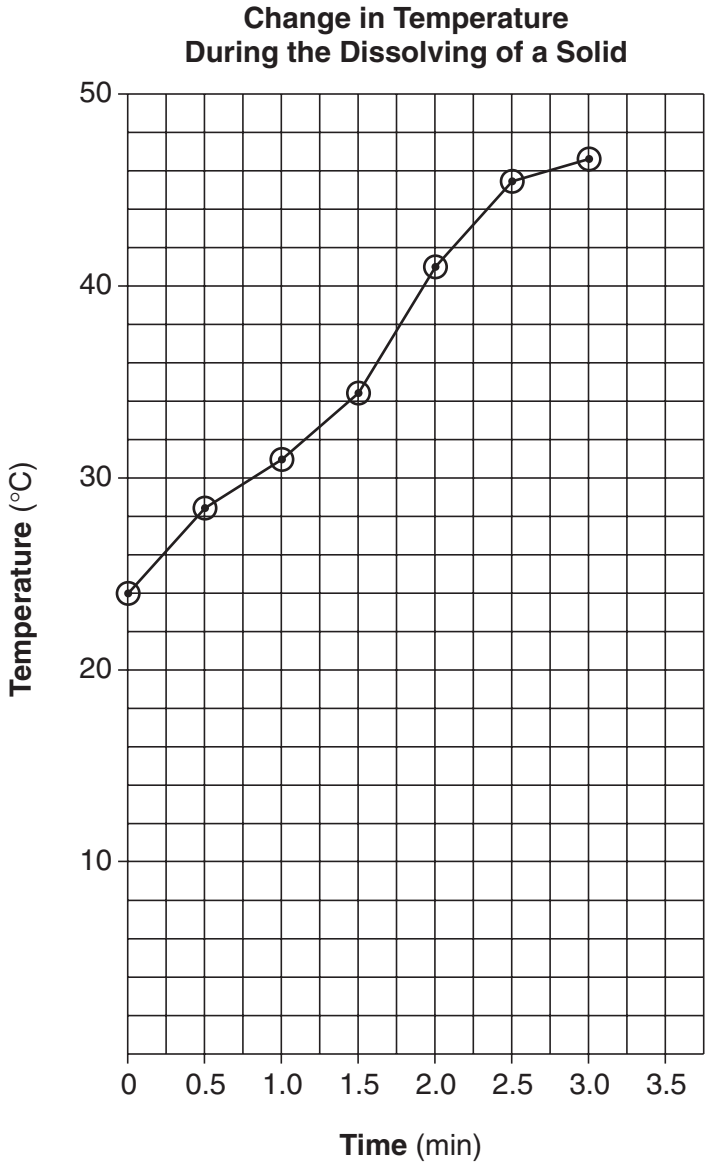
dinitrogen pentoxide

nitrogen(V) oxide

69 [1] Allow 1 credit for a correct numerical setup. Acceptable responses include, but are not limited to, this example:

$\frac{32}{46} \times 100$

70 and **71** An example of an acceptable response is shown below.



70 [1] Allow 1 credit for marking an appropriate scale on the axis labeled "Temperature (°C)." An appropriate scale is one that allows a trend to be seen.

71 [1] Allow 1 credit for plotting six or seven points correctly (±0.3 grid space). Plotted points do *not* need to be circled or connected.

72 [2] ***a*** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

The data show an increase in temperature, which indicates an exothermic reaction.

solution temperature goes up, exothermic

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

Table I shows that ΔH is negative for NaOH and LiBr, which indicates an exothermic reaction.

ΔH is negative for both.

NaOH: $\Delta H = -44.51$ kJ/mol

73 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Heat is transferred from the copper to the water.

Heat flows from the hotter object to the cooler object.

copper heat $\rightarrow$ water

74 [1] Allow 1 credit if all values are correctly placed in the data table as shown below.

Data Table

Quantity Measured	**Data** (units are given)
Mass of copper	**50.0** or **50** g
Temperature of hot copper	**100.0** or **100**°C
Mass of H_2O in calorimeter	**100.0** or **100** g
Initial temperature of H_2O in calorimeter	**23.2**°C
Final temperature of H_2O and copper	**26.3**°C

75 [1] Allow 1 credit for a correct numerical setup. Acceptable responses include, but are not limited to, these examples:

q = (100.0 g) (4.18 J/g•°C) (3.1°C)

(100)(4.18) (26.3-23.2)

or

Allow 1 credit for a setup consistent with the student's data in question 74.

76 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

heat lost to surroundings

heat absorbed by the thermometer

heat absorbed by the calorimeter

77 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Both 2-propanol and water are polar.

2-propanol has an uneven distribution of charge.

—OH functional group is polar.

Like dissolves like.

78 [1] Allow 1 credit for a correct response. Significant figures do *not* need to be shown. Acceptable responses include, but are not limited to, these examples:

62

62.06864

62.1

79 [1] Allow 1 credit for a correct numerical setup. Acceptable responses include, but are not limited to, these examples:

$10.0\ \text{M} = \frac{x\ \text{mol}}{2.50\ \text{L}}$

(2.5) (10)

80 [1] Allow 1 credit for a correct response. The half-reaction must include electrons. Acceptable responses include, but are not limited to, these examples:

$Cu \rightarrow Cu^{2+} + 2e^-$

$Cu - 2e^- \rightarrow Cu^{2+}$

81 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Iron is a more active metal.

Fe above Cu

Iron metal loses electrons more easily than copper metal.

copper less active

82 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

$^{137}_{55}Cs \rightarrow {}^{0}_{-1}e + {}^{137}_{56}Ba$

$^{137}_{55}Cs \rightarrow {}^{0}_{-1}\beta + {}^{137}_{56}Ba$

83 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

one hundred

100

84 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Iodine-131 would decay faster.

Iodine has a much shorter half-life.

Most of the I-131 would be gone.

The *Chart for Determining the Final Examination Score for the January 2005 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Thursday, January 27, 2005. 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.

Map to Core Curriculum

January 2005 Physical Setting/ Chemistry			
Question Numbers			
Key Ideas	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		63,65	66,69,70,71,74, 75,79
Math Key Idea 2			
Math Key Idea 3		57,63	66,68,69
Sci. Inq. Key Idea 1		52	77,81,84
Sci. Inq. Key Idea 2			
Sci. Inq. Key Idea 3		46,48,64	72a,72b,76,81
Eng. Des. Key Idea 1			
Standard 2			
Key Idea 1		61	
Key Idea 2			
Standard 6			
Key Idea 1			73
Key Idea 2			
Key Idea 3			
Key Idea 4			
Key Idea 5			
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4 Process Skills			
Key Idea 3		31,32,33,34,35, 36,37,39,40,41, 42,43,44,45,47, 59,60,62	66,67,70,78,79, 80,82
Key Idea 4		49,50,54,55,56, 58	75,83,84
Key Idea 5		38,51,53	
Standard 4			
Key Idea 3	1,2,3,4,5,6,8,9, 10,15,19,21,23, 24,25,26,27,29	31,32,33,34,35, 37,39,40,41,42, 43,44,45,46,47, 48,57,58,59,60, 61,62,63,64,65	66,67,68,69,70,71, 77,78,79, 80,81
Key Idea 4	16,17,18	49,50,54,55,56	72a,72b,73,74,75, 76,82,83,84
Key Idea 5	7,11,12,13,14, 20,22,28,30	36,38,51,52,53	
Reference Tables			
2002 Edition	2,4,5,6,8,9,11, 12,14,20,22,23, 25,26,28,29	32,33,36,38,41, 44,46,47,48,49, 50,51,53,59,60, 61,62,63,65	68,69,72b,75,77, 78,79,80,81,82, 83,84