

FOR TEACHERS ONLY

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

P.S.–CH PHYSICAL SETTING/CHEMISTRY

Tuesday, June 24, 2014 — 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 2 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 at: <http://www.p12.nysed.gov/assessment/> and select the link "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 | 9 4 | 17 4 | 25 1 |
| 2 3 | 10 2 | 18 3 | 26 2 |
| 3 2 | 11 2 | 19 1 | 27 3 |
| 4 4 | 12 3 | 20 2 | 28 2 |
| 5 2 | 13 1 | 21 1 | 29 4 |
| 6 2 | 14 4 | 22 3 | 30 3 |
| 7 1 | 15 4 | 23 4 | |
| 8 2 | 16 1 | 24 3 | |
| Part B–1 | | | |
| 31 4 | 36 3 | 41 1 | 46 1 |
| 32 2 | 37 1 | 42 4 | 47 2 |
| 33 3 | 38 2 | 43 4 | 48 2 |
| 34 4 | 39 4 | 44 2 | 49 3 |
| 35 3 | 40 4 | 45 1 | 50 1 |

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Regents Examination in Physical Setting/Chemistry. Additional information about scoring is provided in the publication *Information Booklet for Scoring Regents Examinations in the Sciences*.

Do not attempt to correct the student's work by making insertions or changes of any kind. If the student's responses for the multiple-choice questions are being hand scored prior to being scanned, the scorer must be careful not to make any marks on the answer sheet except to record the scores in the designated score boxes. Marks elsewhere on the answer sheet will interfere with the accuracy of the scanning.

Allow 1 credit for each correct response.

At least two science teachers must participate in the scoring of the Part B–2 and Part C open-ended questions on a student's paper. 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 more than approximately one-half of the open-ended questions on a student's answer paper. Teachers may not score their own students' answer papers.

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. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

Fractional credit is *not* allowed. Only whole-number credit may be given for a response. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

For hand scoring, raters should enter the scores earned in the appropriate boxes printed on the separate answer sheet. Next, the rater should add these scores and enter the total in the box labeled "Total Raw Score." Then the student's raw score should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> on Tuesday, June 24, 2014. The student's scale score should be entered in the box labeled "Scale Score" on the student's answer sheet. The scale score is the student's final examination score.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

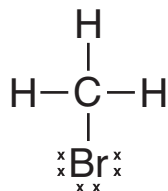
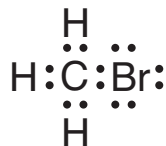
Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score.

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. The position of the electrons can vary.

Examples of 1-credit responses:



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

Group 18 elements rarely form compounds because their atoms have stable electron configurations.

Their valence shells are completely filled.

All the elements have maximum numbers of valence electrons.

Atoms of Group 18 have a stable octet except He, which is stable with two electrons.

- 53** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

A potassium atom has four electron shells and a potassium ion has three electron shells.

A potassium atom has one more electron shell than a potassium ion.

A K^+ ion has one fewer electron than a K atom.

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

metallic bonding

metallic

55 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

0.500 M

0.50 M

.5 M

56 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The solution that contains 1.25 moles of NaCl has a lower freezing point.

lower for the first one

higher for the solution with 0.75 mol

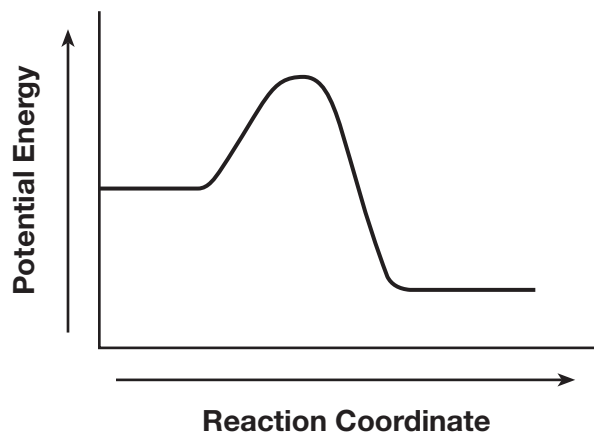
The 0.30 M solution has a higher freezing point than the 0.50 M solution.

This solution has a lower f.p.

57 [1] Allow 1 credit for CH₂O. The order of the elements can vary.

58 [1] Allow 1 credit for showing *both* a peak that is higher than the beginning and the end of the curve *and* that the PE of the products is lower than the PE of the reactants.

Example of a 1-credit response:



59 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

alcohol

alcohols

primary alcohol

monohydroxy alcohols

60 [1] Allow 1 credit for any value from 78°C to 80.°C, inclusive.

61 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Ethane has weaker intermolecular forces (IMF) than ethanol.

Ethanol has hydrogen bonding.

Van der Waals forces are weaker in C₂H₆.

62 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

electrons

e⁻

e

63 [1] Allow 1 credit for 3 Zn(s) + 2 Fe³⁺(aq) → 3 Zn²⁺(aq) + 2 Fe(s).

64 [1] Allow 1 credit for the symbol *or* name of any metal listed above Zn on Table J.

65 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Zinc atoms from the electrode are oxidized to zinc ions in the solution, decreasing the mass of the electrode.

Zinc atoms become Zn²⁺(aq).

The atoms become ions dissolved in the water.

Zn atoms lose electrons, producing ions in solution.

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. Acceptable responses include, but are not limited to:

Thomson model

Thomson

plum pudding model

67 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

An atom is mainly empty space.

It has a nucleus.

The small, dense nucleus is positively charged.

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

proton

p

p⁺

${}^1_1\text{P}$

${}^1_1\text{H}$

H⁺

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

Atoms have electrons.

Atoms have small, negatively charged particles.

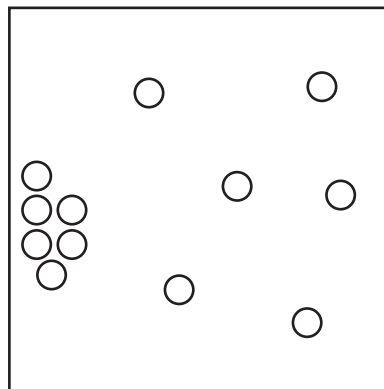
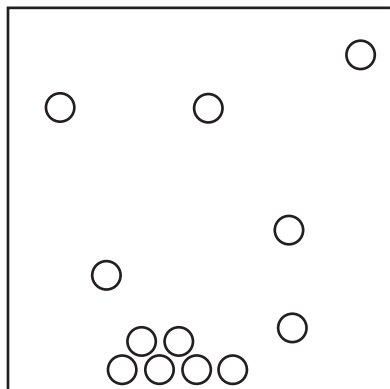
Both models show an internal structure.

Atoms are neutral.

70 [1] Allow 1 credit for 7.73 mol *or* for any value from 7.7 mol to 8 mol, inclusive.

71 [1] Allow 1 credit. Molecules of the gas must be drawn farther apart than the molecules of the liquid.

Examples of 1-credit responses:



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

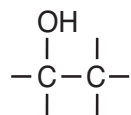
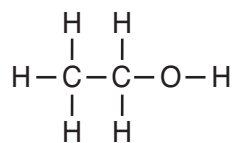
$$P_2 = 313 \text{ K} \left(\frac{6.1 \text{ atm}}{293 \text{ K}} \right)$$

$$\frac{6.1 \text{ atm}}{293 \text{ K}} = \frac{P_2}{313 \text{ K}}$$

$$\frac{(6.1)(508)(313)}{(293)(508)}$$

73 [1] Allow 1 credit.

Examples of 1-credit responses:



74 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Zymase is a catalyst that provides an alternative pathway, which requires less energy.

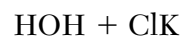
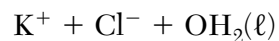
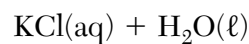
decreases the activation energy

changes the reaction mechanism

75 [1] Allow 1 credit for 138 g *or* for any value from 137.8 g to 138.3 g, inclusive.

76 [1] Allow 1 credit for 3 *or* three.

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



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

0.111 M

0.11 M

0.1 M

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

The student should immediately place his/her arm under running water to dilute and wash away the KOH(aq).

Tell the teacher.

80 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Heat flows from the air in the flask to the dry ice.

air to CO₂

to dry ice

from air

81 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

sublimation

subliming

82 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The CO₂ molecules in the dry ice have less entropy than the CO₂ molecules in the inflated balloon.

The CO₂ gas in the balloon is more disordered.

less for CO₂(s)

83 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

A tritium atom has two neutrons and an H-1 atom has no neutrons.

Only the tritium atom has neutrons.

H-1 has no neutrons.

84 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

$\frac{1}{4}$

0.25

25%

85 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

${}^3_2\text{He}$

helium-3

He-3

${}^3\text{He}$

Regents Examination in Physical Setting/Chemistry

June 2014

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

The *Chart for Determining the Final Examination Score for the June 2014 Regents Examination in Physical Setting/Chemistry* will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> on Tuesday, June 24, 2014. 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.

Online Submission of 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 <http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm>.
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.

Map to Core Curriculum

| June 2014 Physical Setting/Chemistry | | | |
|---|---|--|--|
| Question Numbers | | | |
| Key Ideas/Performance Indicators | Part A | Part B | Part C |
| Standard 1 | | | |
| Math Key Idea 1 | | 37 | 71, 72, 76, 84 |
| Math Key Idea 2 | | 40, 47, 60, 63 | |
| Math Key Idea 3 | | 34, 35, 39, 42, 46, 55 | 70, 75, 78, 85 |
| Science Inquiry Key Idea 1 | | 52, 53, 54, 56, 59, 61, 62, 65 | 66, 68, 69, 74, 80, 81, 83 |
| Science Inquiry Key Idea 2 | | | 79 |
| Science Inquiry Key Idea 3 | | 32, 35, 36, 38, 39, 41, 43, 45, 46, 48, 58, 59, 63, 65 | 66, 77, 85 |
| Engineering Design Key Idea 1 | | | |
| Standard 2 | | | |
| Key Idea 1 | | 33 | 68, 69 |
| Key Idea 2 | | | 67 |
| Key Idea 3 | | 42 | |
| Standard 6 | | | |
| Key Idea 1 | | | 80 |
| Key Idea 2 | | 37 | 71 |
| Key Idea 3 | | 47 | |
| Key Idea 4 | | 44 | |
| Key Idea 5 | | 40 | |
| Standard 7 | | | |
| Key Idea 1 | | 50 | |
| Key Idea 2 | | | |
| Standard 4 Process Skills | | | |
| Key Idea 3 | | 31, 32, 33, 34, 36, 44, 48, 49, 55, 57, 59, 62, 63, 64 | 66, 67, 68, 69, 70, 71, 72, 73, 75, 77, 78, 82, 83 |
| Key Idea 4 | | 40, 50, 58 | 84, 85 |
| Key Idea 5 | | 38, 51, 61 | |
| Standard 4 | | | |
| Key Idea 3 | 1, 2, 3, 4, 6, 7, 9, 10, 13, 16, 17, 19, 20, 22, 24, 25, 26, 27, 28, 29, 30 | 31, 32, 33, 34, 35, 36, 37, 41, 43, 44, 45, 46, 47, 48, 49, 55, 56, 57, 59, 62, 63, 64, 65 | 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 82, 83 |
| Key Idea 4 | 15, 18, 23 | 40, 42, 50, 58 | 80, 81, 84, 85 |
| Key Idea 5 | 5, 8, 11, 12, 14, 21 | 38, 39, 51, 52, 53, 54, 60, 61 | |
| Reference Tables | | | |
| 2011 Edition | 1, 2, 5, 7, 9, 12, 17, 18, 19, 24, 27, 29, 30 | 31, 32, 33, 34, 37, 39, 41, 42, 45, 46, 48, 51, 52, 53, 54, 55, 59, 60, 64 | 68, 70, 72, 73, 77, 78, 83, 84, 85 |