FOR TEACHERS ONLY

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

PHYSICAL SETTING/ CHEMISTRY

Wednesday, August 17, 2022 — 8:30 to 11:30 a.m., only

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.nysed.gov/state-assessment/high-school-regents-examinations 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.
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*.

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 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. Do not attempt to correct the student’s work by making insertions or changes of any kind. 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.nysed.gov/state-assessment/high-school-regents-examinations on Wednesday, August 17, 2022. 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 for Au or gold.

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

  The halogen atoms all have seven valence electrons.

  Since atoms of these elements have the same number of outer shell electrons, they tend to have similar properties.

  All halogen atoms need one more electron to form a stable octet.

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

  The chlorine atom is smaller than a chloride ion.

  The Cl\(^-\) ion is larger.

  The atom is smaller.

54 [1] Allow 1 credit. The positions of the electrons may vary.

Example of 1-credit responses:

\[
\begin{array}{c}
\text{F} \\
\text{F} \\
\end{array}
\]

\[
\begin{array}{c}
\text{F} \\
\text{F} \\
\end{array}
\]
Allow 1 credit for 3 or three.

Allow 1 credit for 180. kPa or 180 kPa.

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

\[
\frac{120 \text{ kPa}}{101.3 \text{ kPa/atm}} \times \frac{1 \text{ atm}}{101.3 \text{ kPa}}
\]

\[
\frac{120 \text{ kPa}}{101.3 \text{ kPa/atm}} = \frac{100 \text{ kPa}}{1 \text{ atm}}
\]


Allow 1 credit for 174 g or any value from 173.997 g to 174.3 g, inclusive.

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

The potential energy of the water molecules increases.

The water vapor molecules have greater potential energy.

The steam has more PE.

The entropy of the liquid is less than the entropy of the gas.

H₂O(ℓ) has less entropy.

The gas is more random.

Steam is more disordered.

Allow 1 credit for 3.4 g or any value from 3.4 g to 3.41 g, inclusive.
63  [1] Allow 1 credit for 2 or two.

64  [1] Allow 1 credit. Acceptable responses include, but are not limited to:

\[ ^3\text{He} \]
He-3
helium-3
\[^3\text{He} \]

65  [1] Allow 1 credit for any nuclide on Table N that decays by \( \beta^- \) emission and has a half-life longer than 12.31 y. Acceptable responses include, but are not limited to:

\[^{14}\text{C} \]
Cs-137
\[^{90}\text{Sr} \]
technetium–99
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 \( \text{P}_4\text{O}_{10}(s) + \text{6} \text{H}_2\text{O}(\ell) \rightarrow \text{4} \text{H}_3\text{PO}_4(aq) \).

Allow credit even if the coefficient “1” is written in front of \( \text{P}_4\text{O}_{10}(s) \).

67  [1]  Allow 1 credit for \( \text{P}_2\text{O}_5 \). The order of the elements may vary.

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

\[
\frac{4(30.97376 \text{ u})}{283.89 \text{ u}} \times 100
\]

\[
\frac{4(31)(100)}{284}
\]

\[
\frac{123.90}{283.89} \times 100
\]

\[
\frac{12400}{283.9}
\]

Note: Do not allow credit if the fraction is not multiplied by 100.

69  [1]  Allow 1 credit for \( +5 \) or \( 5+ \).
70 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

CaCO₃ has very low solubility.

Limestone is not soluble in water.

insoluble

71 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The energy term is on the reactant side of the equation.

Heat is on the left side of the equation.

Heat must be added to decompose limestone and form lime.

72 [1] Allow 1 credit for Ar or argon

73 [1] Allow 1 credit for ionic bonding or ionic.

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

The number of moles of H⁺(aq) ions is equal to the number of moles of OH⁻(aq) ions.

The number of hydrogen ions is the same as the number of hydroxide ions.

The ratio of H⁺ to OH⁻ is 1:1.

75 [1] Allow 1 credit for 0.21 M or any value from 0.2 M to 0.21 M, inclusive.

76 [1] Allow 1 credit for C or carbon.

77 [1] Allow 1 credit for propanone and propanal.
The Cu metal is less active than Zn metal since Cu metal does not react with any of the solutions and Zn metal reacts with two solutions.

Zinc metal is more chemically active than copper metal, because zinc reacts with Fe²⁺ ions and copper does not.

The Zn(s) reacted with the Cu²⁺(aq), but the Cu(s) does not react with the Zn²⁺(aq).

Zinc is dark in more solutions.

Note: Do not allow credit for a response based on Table J.

The Mg(s) strip loses the same number of electrons that the Zn²⁺(aq) ions gain.

The number of electrons lost and gained are equal.

equal

same

Sanding the surface of the metal strip exposes unoxidized metal for a possible reaction.

Cleaning the metal provides a fresh metal surface for the reaction.

If a reaction will occur, it is more likely with pure metal available.

removes tarnish

increase surface area of the pure metal
82  [1] Allow 1 credit. Acceptable responses include, but are not limited to:

The tetrachloroethene has stronger intermolecular forces than in CCl₄.

The attractions between the molecules of tetrachloromethane are weaker.

C₂Cl₄ has stronger IMFs.

83  [1] Allow 1 credit.

Examples of 1-credit responses:

\[
\begin{array}{c}
\text{H} & \text{H} & \text{H} \\
\text{Br} & \text{C} & \text{C} & \text{C} & \text{H} \\
\text{H} & \text{H} & \text{H} \\
\end{array}
\]

Note: Do not allow credit if only some of the H atoms bonded to C atoms are shown.

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

This nuclear reaction releases more energy per gram than a chemical reaction.

The nuclear reaction releases more energy.

A chemical reaction releases less energy.

85  [1] Allow 1 credit for 58.2 y. Significant figures do not need to be shown.
Regents Examination in Physical Setting/Chemistry
August 2022
Chart for Determining the Final Examination Score for
the August 2022 Regents Examination in Physical Setting/
Chemistry will be posted on the Department’s web site at:
http://www.nysed.gov/state-assessment/high-school-regents-examinations on
Wednesday, August 17, 2022. 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:

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.
## August 2022 Physical Setting/Chemistry

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