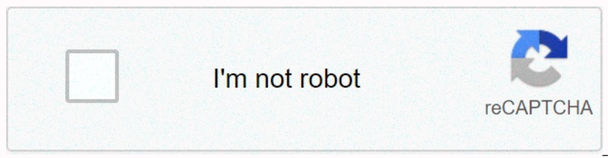

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Ap chemistry 1999 free response answers

Now that the 2018 AP Chemistry Exam administration is on the books, all of us AP Chemistry teachers now have the opportunity to reflect on the year as we turn our attention to preparing for the fall. Part of this process is reviewing the free answer questions published from this year's exam. Each year, the College Board publishes the FRQs of the operational exam (Form O, the version of the exam that most students in the United States take) forty-eight hours after the completion of the administration. FRQs published since the exam redesign in 2014 can be found here and questions from 1999-2013 can be found here. Official scoring guidelines will be published late in the summer after the exam reading, followed by the extremely valuable Chief Reader Report, score statistics, and sample student responses. Until then, teachers around the world post their draft responses on the National AP Chemistry Teachers Facebook page or in the AP Chemistry teachers community and reflect on the exam and what we can learn from it. I strongly suggest that all AP teachers take the time to fully respond to each published FRQ in order to gain a deeper understanding and feel of the test. Also, read the Chief Reader's Report when it's published, read what others post online, and participate in the conversation about how the exam is scored. At BCCE this summer, AP Chief Reader Dr. Paul Bonvallet will give a presentation reviewing the exam. It's always a very informative talk. My draft responses to the 2018 FRQs, as well as my prediction of how the points will be awarded are attached to this post as a PDF. Now I will reflect on each of the questions, the exam in general, and highlight things that I believe teachers, especially new teachers, can take away from this test. Question 1(a)-(c) - The question is very simple at first, and I enjoyed the unique way in which the limiting answer question was presented. I appreciated the use of more than two reagents and that the limiting reagent could be determined without doing much (or actually showing any!) mathematics, if a student had a strong understanding of proportional reasoning and immediately recognized equimolar solutions. (d) - Reading graphics and glassware at the right levels of accuracy is an important skill and has been shown repeatedly since the redesign. Only one point will be awarded on each test for the appropriate significant figures and will always be a laboratory scenario. Note that it may or may not be specified for the student to report the value with the appropriate number of sig figs. bet is that this was the following question fig, although others have suggested part (b) since the volume of the solution provided was so accurate (100.00 mL). See 2010 #3 for a very similar question. (e) - Part (i) is very simple, and I liked that they gave a value for heat capacity the solution that differed from that of water. I can modify some of my practices to do this, rather than assuming as long as it is 4,184 J/g.C. Part (ii) is likely to shake the AP pot teacher community due to the use of the concept by reaction mole. For those who are not familiar, by reaction mole basically means every time the reaction runs as written. We will have to wait to see until after reading which calculated value(s) got credit(s). For more information on this concept, read this article written by James Spencer, co-chair of the AP Exam Redesign Commission . (f) - Would a student receive credit for simply quoting that thermodynamic amounts are intensive properties? It probably won't be based on conversations I've had with previous APs. The student would have to explain in his response that the intensive properties do not vary with the amount or indicate his reasoning in terms of mole. (g) - Remember, just because question 4 of the legacy exam has disappeared, that doesn't mean students don't have to write equations. In fact, this year they had to write three! This was very simple, as sodium was the viewer's only ion. Question 2(a) - I really liked this question. It was a unique way to test the qualitative aspects of steichiometry and a reminder of the importance of particle diagrams for both test success and strong steichiometric understanding. Ask your students to draw a ton of particle diagrams, especially in freshman chemistry, by balancing equations and doing stachymetry. [1] I wonder how many students didn't realize this was a limiting reaction problem... (b)-c) - These questions are about balance and are very simple. For b (ii) I wonder how many students got stuck when they got to the quadratic and didn't know what to do. I hope not many, since the question does not ask for a specific value to be calculated. This is a good reminder that quantitative mastery does not equate to conceptual understanding and that the AP will never require students to solve a quadratic equation to get an answer to any problem. (d) - This was a very direct linking question. Have your students practice filling skeletal structures like this, which often appear for more complex molecules. Two different structures are possible, and both would earn points as students were not asked to consider the formal position. (e)-(f) - A very simple, direct and direct assessment of weak acid/strong base with predictable questions. Question 3(a) - Students will probably forget that electrons 4s will be of an iron atom before 3d electrons. Some teachers have expressed concern about Aufbau exceptions, but I see no problem here, as the course and description of the exam (CED) do not require knowledge of any exceptions in the exam. (b)-c) - Basic Atomic Structure and Coulomb Coulomb Law I wonder how specific or vague the wording will be for (b) to win the point. (d)-(e) - A simple redox rating. I am surprised by the numerous uses of molarity in FRQ this year. I may be wrong that it's abnormal, but at this point in the test I was thinking, wow, more solution sichiometry! An absurd question, if you know what you're doing, it has a lot of hilarious messages on social media. Make sure the student knows the proper vocabulary of the team! (g)-i) - The wording of part (i) will make the students write here, I'm afraid and perhaps it could have been formulated a little more clearly. But with an FRQ that has already been criticized by students and teachers for its length (9 parts, tying the longest FRQs of the redesigned exam with 2014 #1 and 2015 #1). This is likely to be just a single point. Question 4(a) - Students were once again asked to explain how a non-polar substance may have a higher boiling point than a polar substance. This is a favorite question, it seems, as test writers try to exploit the common misconception that comes simply from memorizing that LDFs are weak. (b) - A pleasant surprise that should be worth two points. As I say to my students: Give me the points! Question 5 (a) - A good use of particle diagrams to test the understanding of weak acids. I'd rather they had to choose which one was the most accurate representation. The fact that they were told Figure 1 was better was a great advantage! (b) - Students will assume that -x is insignificant even if they have calculated it by determining [H+]. This will cost a lot of a point. Writers seem to be testing students by understanding when to ignore the -x in various ways in recent years. (c) - This will be a blood bath, just as it was in 2016 #6. Use Q v. K, it's your friend Both (b) and (c) harken back to 2016 #6 where the modal score was a 0/4. See what was said about this question about what is now called the Chief Reader's Report. This is a great question to encourage good discussion in class. Question 6(a) - As far as I know, it's the first time students have been asked to explain the purpose of the salt bridge, rather than tracing the direction of the ion flow, so it will be interesting to see which phrasing gains credit. Many probably still think that electrons flow through it... (b) - Very simple, get those points! Although the algebraic sign of Eo will probably have many students. Question 7(a) - Simple identification of PES. It would have been nice to see a follow-up question that had more depth, but that means there was an easy point available for constant speed units in part (b). (b)-c) - Simple kinetic questions from order and half-life. Teachers and students have been left complaining that it is unfair because nuclear chemistry is not part of the course. However, I do not share your frustration. The CED clearly mentions radioactive decomposition as example of top kinetics in Essential Knowledge Statement 4A.3(e) in Learning Goal 4.3 and even if it did not, students must clearly recognize that if the half-life is citable, then it must be constant and therefore the process is of the first order, no matter what that process is. I hope this question points very high. General Impressions This was a very fair free response section that was well balanced between conceptual and quantitative understanding. In recent years we have seen a development of consistency in the style of the exam and evidence that it is very faithful to the CED. One of the goals of the redesign was to create an exam that was true to a set of standards, not just previous iterations of exams. [2] The more reviews we see, the more I believe the Test Development Committee is succeeding in this regard. What are your thoughts this year FRQs? I'm excited to hear how reading is going in a few weeks in THE BCCE report in South Bend, Indiana with everyone! [1] Refer to the following articles and resources on the visualization of chemistry using particle diagrams and the use of the table method (BCA) to solve sichiometry problems. Bridle, Chad A. and Ellen J. Yezierski. Evidence for the effectiveness of research-based and particle-level instruction on conceptions of the nature of matter particles. Journal of Chemical Education, 2012;89;(2), 192-198. DOI: 10.1021/ed100735u. Dukerich, Larry. Conceptual Chemistry. . Hemling, Melissa. Using BCA visual tables to teach to limit reagents, . Posthuma-Adams, Erica. Simple activities to implement particle level diagrams, . Prilliman, Stephan J. Integration of particle representations into AP chemistry and introductory chemistry courses. 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