A level chemistry a h432/01 periodic table elements and physical chemistry 2016

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1 A Level chemistry A. H432/01 Circulatory table, physical elements and chemistry Sample paper questionnology on morning/afternoon Time allowed: 2 hours 15 minutes You must have: Data table for chemistry A. You can use: a scientific computer or EN graphics*. 0 0 0 0 0 0 *. IM. Ec. Name Center Candidate No. SP. GUIDE. Use black ink. You can use HB pencils for graphs and diagrams. Complete the boxes above with your name, center number, and candidate number. Answer all questions. Write your answers to each question in the space provided. Additional paper can be used if necessary but you must clearly show your candidate number, center number and question number(s). Not in barcodes. Information. The total score for this article is 100.2 The signs for each question are displayed in parentheses . The quality of the extended answers will be evaluated in questions marked with a aomarks (*). This document consists of 28 pages. OCR 2016 H432/01 . [601/5255/2] DC () Flip 2. PART A. You should spend up to 20 minutes on this section. Answer all questions. 1 Which row displays the atomic structure of 55Mn2+? Proton neutron electron A 25 30 23. B 25 55 23. C 27 30 25. D 30 25 28. En. Your answer [1]. 2 Group 2 elements react with water, form a solution and a gas. IM. Which statement is correct? A The partner of factors dropped to group 2. Ec. B pH of the formed solution increases to Group 2. C The reaction is a neutral. D The equation for the reaction of strontium to water is: SP.3 2Sr + 2H2O 2 SrOH + H2. Your answer [1]. OCR 2016 H432/01 . 3. 3 Chloroethene, CH2 = CHCl, is prepared in the presence of a solid catalyst using the balancing reaction below. CH2 ClCH2Cl(g) CH2 =CHCl(g) + HCl(g) H = +51 kJ mol 1. What changes will lead to an increase in the balanced yield of chloroethene? Increasing pressure B increases the surface area of catalyst C which increases the temperature D using a consistent catalyst Your answer [1]. En. 4 Table below shows the enthalpy changes of formation, fH. Compound TiCl4(l) H2O(l) TiO2 HCl(g). fH/kJ mol 1. IM. 804 286 945 92. What is the value of the enthalpy change of reaction, rH, for the reaction in the following equation? EC. TiCl4(l) + 2H2O(l) TiO2 (s) + 4 HCl(g). A 63 kJ 1 mol. B 53 kJ mol 1. Sp. C +53 kJ mol 1.4 D +63 kJ mol 1. Your answer [1]. OCR 2016 H432/01 Flip over 4. 5 Zinc reacts with copper sulfate solution (II), CuSO4(aq). What can be used to determine the effect of CuSO 4 (aq) concentration on reaction speed? A gas syringe B balance C colorimeter D pH meter Your answer [1]. 6 The boiling point of hydrogen bromide is 67 C. Boiling point of hydrogen iodine is 34 C. EN. Different boiling points can be explained about the strength of bonds or interactions. Which bonds or responsible for the higher boiling point of hydrogen iodide? IM. EC hydrogen-linked B-plus bonds. C bipolar bipolar permanent interaction D causes bipolar interaction SP. Your answer [1]. 7 Consecutive ionizing energy from 1 to 8, in kJ mol 1, of an element in phase 3 is: 1012 1903 2912 4957 6274 21 269 25 398 29 855.5 What is element? A Al B Si C P. D S. Your answer [1]. OCR 2016 H432/01 . 5. 8 Using the graph, what is the value of the exponential amount, A, for the decomposition of N2O5? 2N2O5(g) 4NO(g) + O2(g). En. IM. A s 1. Ec. B s 1. C 105 s 1. D 1013 s 1. Sp. Your answer [1]. 9 What is the propanoic acid solution, CH3CH2 COOH, which has a pH of 25 C. [H+] in this solution? Another 10 6 mol dm 3. B 10 4 mol dm 3. C 10 3 mol dm 3. D mol dm 3. Your answer [1]. OCR 2016 H432/01 Flip over 6. 10 Enthalpy mesh of calcium chloride can be calculated using three of the enthalpy changes below. Are enthalpy changes unnecessary? An enthalpy change of calcium chloride solution B enthalpy changes the hydration of cl ion C enthalpy changes the formation of calcium chloride D enthalpy changes the hydration of Ca2 ions + Your answer [1].6 11 Which red oxidation reaction contains the greatest change in oxidation status to sulfur? En. H2SO4 + 8HI H2S + 4I2 + 4H2O. B S + O2 SO2. C S2O32 + 2H+ SO2 + S + H2O. IM. D S + 6 HNO3 H2SO4 + 6NO2 + 2H2O. Ec. Your answer [1]. 12 NO(g), H2(g), N2(g) and H2O(g) exist in ebably: SP. 2NO(g) + 2H2(g) N2(g) + 2H2O(g). At room temperature and pressure, the balance state is well located on the right hand side. Which of the following can be the balance constant for this state of balance? Another 10 3 mol dm 3. B 102 mol dm 3. C 10 3 dm3 mol 1. D 102 dm3 mol 1. Your answer [1]. OCR 2016 H432/01 . 7. 13 Copper ions (II) form a complex water ion, X, with chloride ions. What statement about X is true? A X has an optical isolystification B X with a square genital shape C X with the formula CuCl42+. D X is yellow Your answer [1].7 14 Two tests are carried out on a a solution of water of copper (II) sulfate, CuSO4(aq). Test 1: Supplementation of potassium iodine EN solution. Test 2: Which of the following reports is/is correct? 1: Test 1 creates an off-white precipitation and a brown solution. IM. 2: Test 2 creates a white precipitation. 3: Test 1 and test 2 are both oxidative reduction reactions. Ec. A 1, 2 and 3. B Only 1 and 2. Sp. C only 2 and 3. D Only 1. Your answer [1]. OCR 2016 H432/01 Flip over 8. 15 Two students set up the balance system below. CH3 COOC2H5(l) + H2O(l) C2H5OH(l) + CH3 COOH(l). The students benchmarked samples of the balanced mixture with sodium hydroxide, NaOH (aq), to determine the concentration of CH3 COOH. Students used their results to calculate the value for Kc.8 The student's value to Kc was Each other. What of the following reason(s) may explain why values are calculated Kc was different? 1: Each student performs their experiment at a different temperature. 2: Each student uses a different concentration of NaOH (aq) in their concentration. 3: Each student prepares a different volume of the balanced mixture. A.B. 1, 2 and 3. Only 1 and 2 EN. IM.C Only 2 and 3. D Only 1. Ec. Your answer [1]. SP. OCR 2016 H432/01 . 9. BLANK PAGE. En. IM. EC. SP. OCR 2016 H432/01 Flip over 10. PART B. Answer all questions. 16 Ammonia is a gas with co-chemotherapy-linked molecules consisting of nitrogen and hydrogen atoms. (a) Displays the electron configuration of a nitrogen atom using an electron-in-box diagram. Label each shell. 1s . [2]. (b).9 EN. Ammonia can be made from the reaction of nitrogen and hydrogen during haber. IM. N2(g) + 3H2(g) 2NH3(g) H = 92 kJ mol 1 Equation 1. What will increase the temperature available on the components of the balanced mixture and EC. in terms of the value of the balanced constant? Explain your answer. Sp.. [2]. OCR 2016 H432/01 . 11. (c) A chemistry mixes together N2 moles with H2 moles in an airtight container. The mixture is heated and allowed to reach an balanced state. In an balanced state, the mixture contains N2 moles and the total pressure is 500 kPa. Kp. Calculation Displays all your work. Include units in your answer. En. IM. EC. SP. Kp = unit [5]. OCR 2016 H432/01 Flip 12. (d) A chemical company receives an order to deliver 1010 dm3 ammonia at room temperature and pressure. Haber process produces yield.10 Calculate hydrogen volume, in tons, needed to produce ammonia. Give your answers to three key numbers. En. hydrogen mass = necessary tons [3]. IM. (e) (i) Hydrazine, N2H4, used as rocket fuel. Hydrazine can be prepared from the reaction of ammonia to sodium chlorate (I). There are two other products in response. EC. Write an equation for this reaction. SP. [1]. (ii) Using the theory of pushing pairs of electrons, draw a 3-D diagram of a hydrazine molecular. Predict the angle of H N H link around each nitrogen atom. H N H link angle: [2]. OCR 2016 H432/01 . 13. BLANK PAGE. En. IM. EC. SP. OCR 2016 H432/01 Flip 14. 17 Iodine monochloride, ICl, can react with hydrogen to form iodine. 2 ICl + H2 2 HCl + I2. This reaction is carried out several times using different concentrations of ICl or H2. 1 A Level chemistry A. H432/01 Circulatory table, physical elements and chemistry Sample paper questionnology on morning/afternoon Time allowed: 2 hours 15 minutes You must have: Data table for chemistry A. You can use: a scientific computer or EN graphics*. 0 0 0 0 0 0 *. IM. Ec. Name Center Candidate No. SP. GUIDE. Use black ink. You can use HB pencils for graphs and diagrams. Complete the boxes above with your name, center number, and candidate number. 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