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| **Narrogin SHS Year 11 ATAR CHEMISTRY Name:** | |
| --- | --- |
| Task No: | 12 |
| Task Type: | Test |
| Content: | Reactions in aqueous solutions |
| Task Description: | Complete the attached questions on the multiple choice answer sheet or in the spaces provided.  Marks will be awarded for presentation and working.  **Test conditions (50 minutes).**  *Formulae and data booklet provided.*  *Non-programmable calculator permitted.* |
| Total Marks: | 26 |
| Weighting: | 2.15% |
| Due Date: | 27 August 2020 |

**IMPORTANT NOTE TO CANDIDATES**

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

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**Multiple Choice Answer Sheet**

**Task Number: \_\_ Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Year: \_\_**

**Multiple Choice – 12 questions.**

Circle your choice. If you change your mind, scrub your choice out and circle the one you want. If it is messy, clearly write your choice next to question.

1. A B C D

2. A B C D

3. A B C D

4. A B C D

5. A B C D

6. A B C D

7. A B C D

8. A B C D

9. A B C D

10. A B C D

11. A B C D

12. A B C D

**Section 1: Multiple Choice** (1 mark each)

*Indicate your answers on the multiple choice answer sheet*

1. Which of the following equations shows only the reacting species (i.e. does not contain any spectator ions)?
2. 2NaI(aq) + Pb(NO3)2(aq) 🡪 PbI2(s) + 2NaNO3(aq)
3. Ag+(aq) + Cl-(aq) 🡪 AgCl(s)
4. Ba2+(aq) + 2NO3-(aq) + 2Na+(aq)+ SO42-(aq) 🡪 BaSO4(s) + 2Na+(aq) + 2NO3-(aq)
5. Ca2+(aq) + 2NO3-(aq) + 2K+(aq) + CO32-(aq) 🡪 2K+(aq) + 2NO3-(aq) + CaCO3(s)
6. Hydrochloric acid is said to be a stronger acid than ethanoic acid because
7. aqueous hydrochloric acid conducts electricity but aqueous ethanoic acid does not.
8. hydrochloric acid is more soluble in water than ethanoic acid.
9. hydrochloric acid ionised more completely in aqueous solution than ethanoic acid.
10. the pH of hydrochloric acid is greater than that of ethanoic acid at the same concentration.
11. Which of the following reactions would not produce hydrogen gas?
12. Dilute sodium hydroxide is added to some zinc metal.
13. Dilute hydrochloric acid is added to some zinc metal.
14. Dilute hydrochloric acid is added to some aluminium.
15. Dilute hydrochloric acid is added to solid copper oxide.
16. Consider the following statements.

i. Acids are substances which produce hydrogen ions in aqueous solution.

ii. Acids are proton donors.

iii. Bases are substances which ionise in water to produce hydroxide ions.

iv. A base is a proton acceptor.

Which statements are consistent with the Arrhenius theory of acids and bases?

1. i only
2. i and ii
3. ii and iv
4. i and iii
5. Which of the following pairs of substances, when mixed, would produce a pink precipitate?
6. silver nitrate and sodium bromide
7. manganese nitrate and sodium carbonate
8. calcium chloride and sodium carbonate
9. barium chloride and ammonium sulfate
10. Which of the following pairs of solutions would produce a precipitate when mixed together?
11. Fe(NO3)3 and K3PO4
12. NH4NO3 and Na2CO3
13. Ca(NO3)2 and NaCl
14. MgCl2 and NaBr
15. The [H+] concentration of pure water at 25oC is equal to
16. 1 mol L-1.
17. 10-14 mol L-1.
18. 7 mol L-1
19. 10-7 mol L-1
20. Consider 1M solutions of sodium hydroxide, ethanoic acid, hydrochloric acid and sulfuric acid. In order of **increasing** pH, the solutions would be:
21. sulfuric acid, hydrochloric acid, ethanoic acid, sodium hydroxide.
22. hydrochloric acid, sulfuric acid, ethanoic acid, sodium hydroxide.
23. sodium hydroxide, ethanoic acid, hydrochloric acid, sulfuric acid.
24. sodium hydroxide, ethanoic acid, sulfuric acid, hydrochloric acid.
25. Which of the following is not a strong acid?
26. HCl
27. NaOH
28. H2SO4
29. HNO3
30. If a solution has a pH of 10.0, then the hydroxide ion concentration of the solution is
31. 10 mol L-1
32. 0.1 mol L-1
33. 0.04 mol L-1
34. 0.0001 mol L-1

In a laboratory exam, a student was given FOUR unlabelled test tubes containing solutions of sodium bromide, sodium iodide, sodium nitrate and sodium carbonate. The student was provided with *labelled* solutions of lead nitrate and calcium nitrate and told to use these to correctly identify which solutions were in the four test tubes.

The results obtained by the student are summarized in the table below. Using your knowledge of solubility rules, interpret these results to answer the next four questions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Test tube 1** | **Test tube 2** | **Test tube 3** | **Test tube4** |
| **Addition of 10 drops of Pb(NO3)2** | White precipitate | No reaction | Yellow precipitate | White precipitate |
| **Addition of 10 drops of Ca(NO3)2** | No reaction | No reaction | No reaction | White precipitate |

1. Which test tube contained the sodium nitrate?
2. 1
3. 2
4. 3
5. 4
6. Which test tube contained the sodium iodide?
7. 1
8. 2
9. 3
10. 4

**Section 2: Short Answer**

*Write your answer in the spaces provided*

1. Write balanced ionic equations and observations for the following reactions
2. Aqueous solutions of hydrochloric acid and sodium hydroxide are combined

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1. Aqueous sulfuric acid is combined with solid sodium hydrogen carbonate

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1. Solutions of copper (II) sulfate and sodium carbonate are mixed

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1. Solutions of silver nitrate and potassium chloride are mixed

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(8 marks)

1. What volume of 1.50 M HCl solution could be made up from 10.5mL of 12.0 M HCl solution? (3 marks)
2. Determine the pH of the following: (3 marks)
3. 1.0 M hydrochloric acid
4. 0.05 M sodium hydroxide

**END OF TEST**