Anglo-Chinese School
(Barker Road)
A Methodist Institution
Founded in 1886

CHEMISTRY
DEPARTMENT OF SCIENCE

Name: ..... ( ) Class: SEC 3 .....

SALTS – ASSIGNMENT

Multiple-Choice Questions [20 Marks]

TOTAL SCORE / 30

Write in your selected answer for the multiple-choice questions in the boxes provided.

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

1. Which of the following ionic compounds is the most soluble in water?

A calcium carbonate
B magnesium sulfate
C silver chloride
D zinc hydroxide

2. Which of the following ionic compounds is the least soluble in water?

A ammonium carbonate
B barium sulfate
C iron(III) chloride
D lead(II) nitrate

3. Which of the following pairs of salts can be separated by adding water and filtering?

A barium chloride, lead(II) nitrate
B calcium sulfate, silver chloride
C iron(III) sulfate, zinc nitrate
D magnesium carbonate, lithium iodide

4. Which two pairs of solutions, when mixed, will produce a precipitate?

A barium chloride, potassium nitrate
B copper(II) iodide, sodium nitrate
C hydrochloric acid, silver nitrate
D lead(II) nitrate, zinc nitrate

5. Which two pairs of solutions, when mixed, will **not** produce a precipitate?

A ammonium chloride, silver nitrate
B calcium chloride, sulfuric acid
C lead(II) nitrate, magnesium nitrate
D sodium hydroxide, zinc nitrate

6. Which of the following is **not** an alkali?

A ammonium hydroxide
B calcium hydroxide
C magnesium hydroxide
D sodium hydroxide

7. An unknown compound **X** is insoluble in water and reacts with acids to produce a gas. Which of the following is most likely to be **X**?

A aluminium hydroxide
B copper(II) carbonate
C lithium carbonate
D magnesium metal

8. Aqueous solutions of two salts were mixed. A white precipitate was formed, which was filtered off and transferred to another container. A few drops of dilute hydrochloric acid were added to the solid, and effervescence was observed. What could the two salts be?

A ammonium carbonate, barium nitrate
B copper(II) chloride, silver nitrate
C barium chloride, magnesium sulfate
D iron(III) sulfate, sodium hydroxide

9. Which of the following salts should be prepared by titration?

A calcium sulfate
B lithium chloride
C magnesium nitrate
D silver nitrate

10. Which of the following salts should be prepared by precipitation?

A calcium sulfate
B lithium chloride
C magnesium nitrate
D silver nitrate

11. Jeremy wishes to prepare a sample of potassium chloride. Which of the following solutions would **not** be suitable as a starting reagent?

A potassium carbonate
B potassium hydroxide
C potassium nitrate
D hydrochloric acid

12. Which pair of substances can be used in the preparation of zinc sulfate?

A aqueous zinc nitrate, aqueous sodium sulfate
B zinc metal, dilute sulfuric acid
C solid zinc carbonate, aqueous zinc chloride
D solid zinc oxide, aqueous ammonium sulfate

13. Which pair of substances can be used in the preparation of iron(II) hydroxide?

A aqueous iron(II) chloride, aqueous potassium iodide
B aqueous iron(II) nitrate, aqueous sodium hydroxide
C dilute iron(II) oxide, dilute hydrochloric acid
D solid iron(II) nitrate, potassium hydroxide

14. A student had to prepare a sample of magnesium sulfate. He chose a solid to add to dilute sulfuric acid. The preparation failed. Which solid had he chosen?

A magnesium carbonate
B magnesium hydroxide
C magnesium metal
D magnesium nitrate

15. Which of the following substances should be added to dilute sulfuric acid to prepare lead(II) sulfate?

A aqueous lead(II) nitrate
B lead metal
C powdered lead(II) carbonate
D powdered lead(II) chloride

16. Michelle wishes to prepare a sample of zinc chloride. She executes the following steps:

Step 1: Wash and dry and crystals formed.
Step 2: Add excess zinc carbonate to the solution.
Step 3: Heat the filtrate over an evaporating dish.
Step 4: Place some dilute hydrochloric acid into a beaker.
Step 5: Filter out the excess solid.

In which order should the above steps be carried out?

A 4, 2, 5, 3, 1
B 2, 5, 4, 1, 3
C 4, 3, 2, 1, 5
D 4, 2, 3, 5, 1

17. Which one of the following hydroxides does **not** give a good yield of a salt with dilute hydrochloric acid?

A iron(III) hydroxide
B lead(II) hydroxide
C magnesium hydroxide
D zinc hydroxide

18. How can barium sulfate be best be prepared from barium carbonate?

A Add dilute nitric acid, followed by potassium sulfate and filter.
B Add dilute sulfuric acid and filter.
C Add dilute sulfuric acid, followed by potassium sulfate and filter.
D Add excess water, followed by dilute nitric acid.

19. Which of the following describes a step in the preparation of aqueous barium chloride?

A Add an indicator.
B Add barium sulfate.
C Filter the mixture.
D Heat in evaporating dish.

20. In the preparation of copper(II) sulfate, why is copper metal a poor choice of reactant to add to the dilute sulfuric acid?

A A soluble reactant should be used instead.
B Copper is a very unreactive metal.
C Copper is very expensive.
D Metals do not react with acids.

Structured Questions [10 Marks]

21. (a) Write chemical equations, including state symbols, for the following precipitation reactions:

(i) aqueous barium chloride + dilute sulfuric acid [1]

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(ii) aqueous potassium hydroxide + aqueous iron(III) sulfate [1]

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(b) Lead(II) chloride is an insoluble salt, and can be prepared by mixing solutions of lead(II) nitrate and potassium chloride.

(i) State the chemical equation, including state symbols, for this reaction. [1]

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(ii) Outline the steps, after mixing, to obtain a dry sample of the salt. [1]

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22. Sodium phosphate, Na_3PO_4, is a soluble salt, used as a water softener in washing powders. It is prepared by reacting dilute phosphoric acid, H_3PO_4, with an alkali.

(a) Name the alkali that should be used. [1]

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(b) Give the formulae of the ions present in sodium phosphate. [1]

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(c) Construct a balanced chemical equation, including state symbols, for the reaction between dilute phosphoric acid and the alkali. [1]

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(d) Given solutions of phosphoric acid and alkali, a suitable indicator and standard laboratory apparatus, explain how you would prepare an aqueous sample of sodium phosphate. [3]

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END