

MINGA DAY SECONDARY SCHOOL

GRADE 12 CHEMISTRY TEST 1 – TERM 1 – 2023

DURATION: 1 HOUR 45 MINUTES

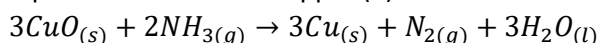
MARKS: 50

NAME: \_\_\_\_\_ CLASS: \_\_\_\_\_

SECTION A [10 MARKS]

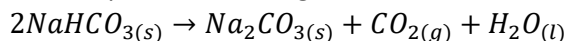
Answer all the questions by crossing out the best answer **A, B, C** or **D** with an **X**

- How many atoms are there in 6.0g of carbon atoms?  
 A.  $3 \times 10^{23}$  C.  $1.2 \times 10^{24}$   
 B.  $6 \times 10^{23}$  D.  $6 \times 10^{24}$
- How many oxygen atoms are 1.6g of sulphur trioxide,  $\text{SO}_3$ ?  
 A. 3 C.  $3.6 \times 10^{22}$   
 B. 4.8 D.  $9.6 \times 10^{23}$
- Determine the relative molecular mass of lead (IV) chloride,  $\text{PbCl}_4$ .  
 A. 249 C. 278  
 B. 349 D. 378
- What is the mass of 0.2 moles of chlorine molecules?  
 A. 142g C. 71g  
 B. 14.2g D. 7.1g
- Which gas contains the same of number of molecules as 9g of water?  
 A. 2g of hydrogen C. 14g of nitrogen  
 B. 32g of oxygen D. 44g of carbon dioxide
- 1.00dm<sup>3</sup> of ammonia gas is passed over heated copper (II) oxide.



What is the volume of nitrogen formed when measured at the same temperature and pressure as the ammonia?

- Using the Periodic Table for the relative atomic masses, which has the least mass?  
 A. 0.1 moles of silicon dioxide,  $\text{SiO}_2$  C. 0.5 moles of oxygen,  $\text{O}_2$   
 B. 0.5 moles of lithium, Li D. 1.0 moles of ammonia,  $\text{NH}_3$
- Sodium hydrogencarbonate decomposes on heating.



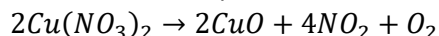
In an experiment, a 0.5mol sample of sodium hydrogencarbonate is heated.

Which volume of carbon dioxide, measured at room temperature and pressure, is evolved?

- Calcium carbonate,  $\text{CaCO}_3$ , decomposes according to the following equation;  

$$\text{CaCO}_{3(s)} \rightarrow \text{CaO}_{(s)} + \text{CO}_{2(g)}$$
 What volume of carbon dioxide, measured at room temperature and pressure is produced when 50g of calcium carbonate is decomposed?  
 A. 12.0dm<sup>3</sup> C. 24.0dm<sup>3</sup>  
 B. 48.0dm<sup>3</sup> D. 120dm<sup>3</sup>

10. On strong heating copper (II) nitrate decomposed to produced copper (II) oxide, nitrogen dioxide and oxygen according to the balanced chemical equation below;



Calculate the mass of copper (II) oxide obtained when 56.4g of copper (II) nitrate decomposed.

- A. 24.0g  
B. 80.0g  
C. 40.0g  
D. 160.0g
11. Methane burns completely in oxygen according to the equation below;  
If 0.2mol of methane is burned completely, which volume of carbon dioxide measured at r.t.p. is formed?  
A. 0.2dm<sup>3</sup>  
B. 2.4dm<sup>3</sup>  
C. 0.6dm<sup>3</sup>  
D. 4.8dm<sup>3</sup>
12. What is the concentration of a solution containing 1.0g of sodium hydroxide in 250cm<sup>3</sup> of solution?  
A. 0.025mol/dm<sup>3</sup>  
B. 0.25mol/dm<sup>3</sup>  
C. 0.10mol/dm<sup>3</sup>  
D. 1.0mol/dm<sup>3</sup>
13. 15.0cm<sup>3</sup> of 1.0mol/dm<sup>3</sup> potassium hydroxide just neutralise 20.0cm<sup>3</sup> of a solution of nitric acid.  
What is the concentration of the acid?  
A. 0.75mol/dm<sup>3</sup>  
B. 1.5mol/dm<sup>3</sup>  
C. 1.0mol/dm<sup>3</sup>  
D. 7.5mol/dm<sup>3</sup>
14. In an experiment 264g of strontium reacts with 213g of chlorine.  
What is the formula of strontium chloride?  
A.  $\text{SrCl}$   
B.  $\text{SrCl}_3$   
C.  $\text{SrCl}_2$   
D.  $\text{Sr}_2\text{Cl}$
15. Calcium burns in oxygen according to the following equation;  
If 5.2g of calcium burns completely, what will be the mass of calcium oxide produced?  
A. 6.8g  
B. 7.8g  
C. 7.3g  
D. 8.0g
16. Calcium reacts with water as shown.  
$$\text{Ca}_{(s)} + 2\text{H}_2\text{O}_{(l)} \rightarrow \text{Ca}(\text{OH})_{2(aq)} + \text{H}_{2(g)}$$
  
What is the total mass of the solution that remains when 40g of calcium reacts with 100g of water?  
A. 58g  
B. 138g  
C. 74g  
D. 140g
17. Which of the following is likely to be the molecular formula of a hydrocarbon containing 85.7% carbon and 14.3% hydrogen by mass?  
A.  $\text{C}_2\text{H}_6$   
B.  $\text{C}_5\text{H}_{12}$   
C.  $\text{C}_3\text{H}_8$   
D.  $\text{C}_6\text{H}_{12}$
18. A compound has the empirical formula  $\text{CH}_2\text{O}$  and a relative molecular mass of 60. What is the molecular formula of this compound?  
A.  $\text{C}_2\text{H}_4\text{O}$   
B.  $\text{C}_3\text{H}_4\text{O}_3$   
C.  $\text{C}_3\text{H}_4\text{O}_2$   
D.  $\text{C}_2\text{H}_4\text{O}_2$
19. An oxide of hydrogen has a percentage composition by mass H = 5.9% and O = 94.1%. Its relative molecular mass is 34. Calculate the molecular formula of the oxide.  
A.  $\text{HO}$   
B.  $\text{H}_2\text{O}_2$   
C.  $\text{H}_2\text{O}$   
D.  $\text{H}_2\text{O}_3$



23. What is the volume occupied by each of the following gases at r.t.p.?
- a. 0.25 moles of nitrogen [2]
- b. 88g of carbon dioxide [2]

**TOTAL [4]**

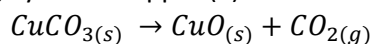
24. (a) Work out the relative formula mass, Mr of the following;
- i.  $\text{Ca}(\text{HCO}_3)_2$  [1]
- ii.  $\text{Al}_2(\text{SO}_4)_3$  [1]
- (b) When water containing dissolved calcium hydrogencarbonate is boiled, the calcium hydrogencarbonate decomposes according to the equation below;
- $$\text{Ca}(\text{HCO}_3)_{2(aq)} \rightarrow \text{CaCO}_{3(s)} + \text{H}_2\text{O}_{(l)} + \text{CO}_{2(g)}$$
- i. Name the white solid formed in this reaction. [1]
- ii. If the water boiled contained 16.2g of calcium hydrogencarbonate, calculate the mass of  $\text{CaCO}_3$  formed. [2]

**TOTAL [5]**

25. (a) Explain what is meant by limiting reactant. [1]
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- (b) 2.4g of magnesium reacts with 0.30mol of hydrochloric acid.
- i. Write a balanced chemical reaction for the reaction. [2]
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- ii. Determine the limiting reactant. [2]
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- iii. Calculate the mass in excess for the substance which is in excess. [1]

**TOTAL [5]**

26. When 12.35g of copper (II) carbonate was heated in a crucible, 7.0g of copper (II) oxide was produced. Calculate the percentage yield of copper (II) oxide.



**TOTAL [2]**