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DAG/DAH 053



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**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)  
SCHOOL OF AGRICULTURE, VETERINARY SCIENCES AND  
TECHNOLOGY (SAVET)**

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS  
2022/2022 ACADEMIC YEAR**

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**MAIN EXAMS  
OF  
DIPLOMA IN AGRICULTURE**

**COURSE CODE: DAG 053**

**COURSE TITLE: BASIC INORGANIC AND PHYSICAL CHEMISTRY**

**DATE: 21.12.23**

**TIME: 3-5PM**

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**INSTRUCTIONS TO CANDIDATES**

Answer ALL Questions.

*MMUST observes ZERO tolerance to examination cheating*

*This Paper Consists of 3 Printed Pages. Please Turn Over*

**ANSWER ALL QUESTIONS (70 MARKS)**

1.(a) From the statement “magnesium hydroxide reacts with nitric acid to produce magnesium nitrate and water,”

i. Identify the reactants and the products (2mks)

ii. Write and balance the chemical equation described by the statement (2mks)

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iii. Indicate the states (2mks)

(b)The following is a chemical reaction equation of photosynthesis?

$\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$ . Balance it indicating the state symbol. (4mks)

2.(a) Calculate the mole of each element present in 18.4 g of iron (III) sulphate.(Fe =56,S =32 and O= 16) (5mks)

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(b)Calculate the percentage composition by mass of Ammonium sulphate,  $(\text{NH}_4)_2\text{SO}_4$  fertilizer (5mks)

3.(a) State 5 application electricity in the farm (5mks)

(b)Explain 10 safety precautions taken while using electricity in the farm (10mks)

4.Copper has a relative atomic mass of 63.55 and consists of two isotopes of mass number 63 and 65.

Calculate the percentage composition of the isotopes. (5mks)

5.(a)define the following:

i. Standard solutions (1mk)

ii. Molarity (1mk)

(b) 25.0 cm<sup>3</sup> of a solution of sodium hydroxide of concentration 0.1 mole dm<sup>-3</sup> were exactly

neutralized by 20.0 cm<sup>3</sup> of a solution of hydrochloric acid. Calculate the concentration of the acid

solution

(i) as a molarity

(ii) in g/dm<sup>3</sup>.

(6mks)

6. (a) Explain 4 factors that affect the rate of a chemical reaction?

(4mks)

(b) Explain why the acid in your stomach is more effective at digesting food if the food has been chewed.

(2mks)

(c). A student leaves an iron nail and some iron wool out in the air. Which will rust quicker?

(2mks)

(d). A student wishes to investigate the rate of reaction of marble chips with acid and different temperatures. Explain why the student must use the same sized chips for both experiments. Different sized chips will have different rates of reactions due to more collisions (2mks)

7. How do you determine the pH of soil in the laboratory using Universal indicator (10mks)

