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CAG 010



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

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2022/2022 ACADEMIC YEAR**

**MAIN EXAMS
OF
CERTIFICATE IN AGRICULTURE**

COURSE CODE: CAG 010

COURSE TITLE: PHYSICAL SCIENCE

DATE: 11.12.23

TIME: 8-10AM

INSTRUCTIONS TO CANDIDATES

Answer ALL Questions

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over

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ANSWER ALL QUESTIONS (70 MARKS)

1. From the statement "nitrogen and hydrogen react to produce ammonia,"

- I. Identify the reactants and the products. (2mks)
- II. Write a balanced chemical equation for the reaction (2mks)
- III. Indicate state symbols (2mks)

2. Calculate the formula mass of

- I. Ammonium sulphate, $(\text{NH}_4)_2\text{SO}_4$
- II. Sodium carbonate decahydrate, $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$.
- III. Oxalic acid, $\text{HOOC}-\text{COOH}$
- IV. (Maleic acid $\text{HOOC}-\text{CH}=\text{CH}-\text{COOH}$ (4mks)

3. (a) Chlorine exist in two isotopic forms; ^{35}Cl and ^{37}Cl in percentage compositions of 75% and 25% respectively.

Calculate the relative atomic mass of chlorine (5mks)

(b) Calculate the percentage of water of crystallization in hydrated sodium carbonate,

$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$? Na=23, O=16, C=12 (5mks)

4. Determine the formula of a lead compound, given that 4.14 g of lead combines with 0.64 g of sulphur and 1.28 g of oxygen. (5mks)

6. In an experiment to determine the concentration dilute sulphuric acid in moles per litre, 25 cm³ of 0.2M sodium hydroxide solution required 24.6 of the acid. Calculate the molarity of the acid. (5mks)

7.(a) State three Newtons laws of motion citing their application in Agriculture (6mks)

(b) The sign of work done by a force on a body is important to understand. State carefully if the following quantities are positive or negative.

- (i) Work done by a man in lifting a bucket out of a well by means of a rope tied to the bucket.
- (ii) Work done by the gravitational force in the above case.
- (iii) Work done by friction on a body sliding down an inclined plane.
- (iv) Work done by an applied force on a body moving on a rough horizontal plane with uniform

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velocity.

(v) Work done by the resistive force of air on a vibrating pendulum in bringing it to rest.

(5mks)

8. State giving examples three differences between chemical and physical changes **(6mks)**

9. (a) State 5 applications of electricity in the farm **(5mks)**

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

10 (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)

