KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATURAL SCIENCES GRADE 9
TERM 2 TOPIC TEST NO. 4
Topic: Acids and Bases
Marks: 21 **Time:** 21 minutes

Question 1

Choose the correct answer and write only the letter (A – D) next to the question number (1.1 – 1.2), e.g., 1.3 D.

1.1 Which ONE of the following balanced chemical equations correctly represents the reaction between calcium oxide and hydrochloric acid?

A $CaO + 2HCl \rightarrow CaCl_2 + 2H_2O$
B $K_2O + 2HCl \rightarrow 2KCl + H_2O$
C $CaO + 2HCl \rightarrow CaCl_2 + H_2O$
D $CaO + H_2SO_4 \rightarrow CaSO_4 + H_2O$ (1)

[1]

Question 2

2.1 The following table contains different substances which are commonly found in most households with their respective pH values.

Substance found in most households	pH-value
Bleach	13,1
Vinegar	3,2
Oven cleaner	11,2
Distilled water	7,05

2.1.1 Use the information in the above table to draw a bar graph in the graph paper provided to show pH values of different substances found in most households. (5)

2.1.2 Which ONE is the most BASIC / ALKALINE substance? Give reason for your answer. (2)

[7]

Question 3

An experiment is conducted to investigate how fast (rate) magnesium oxide reacts with hydrochloric acid solutions with different pH-values. Method:

- Six samples of magnesium oxide, each weighing exactly 10 g are placed in six similar glass beakers labelled A to F.
- A volume of 200 ml of hydrochloric acid, each with a different pH-value, is poured into each of the glass beakers.
- The time taken for the magnesium oxide to completely react with the hydrochloric acid in each beaker is measured, using the same stopwatch.

(Completely reacts means that ALL the magnesium oxide was used up.)

The results were recorded in the table below.

Glass Beaker	**A**	**B**	**C**	**D**	**E**	**F**
The pH-values of the hydrochloric acid	1	2	3	4	5	6
Time (in seconds) taken for all the magnesium oxide to react with the acid	15	40	65	95	125	160

3.1 Write down the CHEMICAL FORMULA for magnesium oxide. (1)

3.2 Complete the general word equation for the reaction between an acid

Metal oxide + Acid → Salt + ….. (1)

3.3 Name TWO properties of acids. (2)

3.4 What practical method can a scientist use to determine the pH of a solution? (1)

3.5 What is the pH-value of the solution with the highest acidity in the table above? (1)

3.6 Explain the meaning of a pH of 7. (1)

3.7 Refer to the table of results above and give the pH of the acid when all the magnesium oxide reacts within 95 s. (1)

3.8 Identify the independent variable in this experiment. (1)

3.9 Identify two variables that were controlled (kept constant) in this experiment (2)

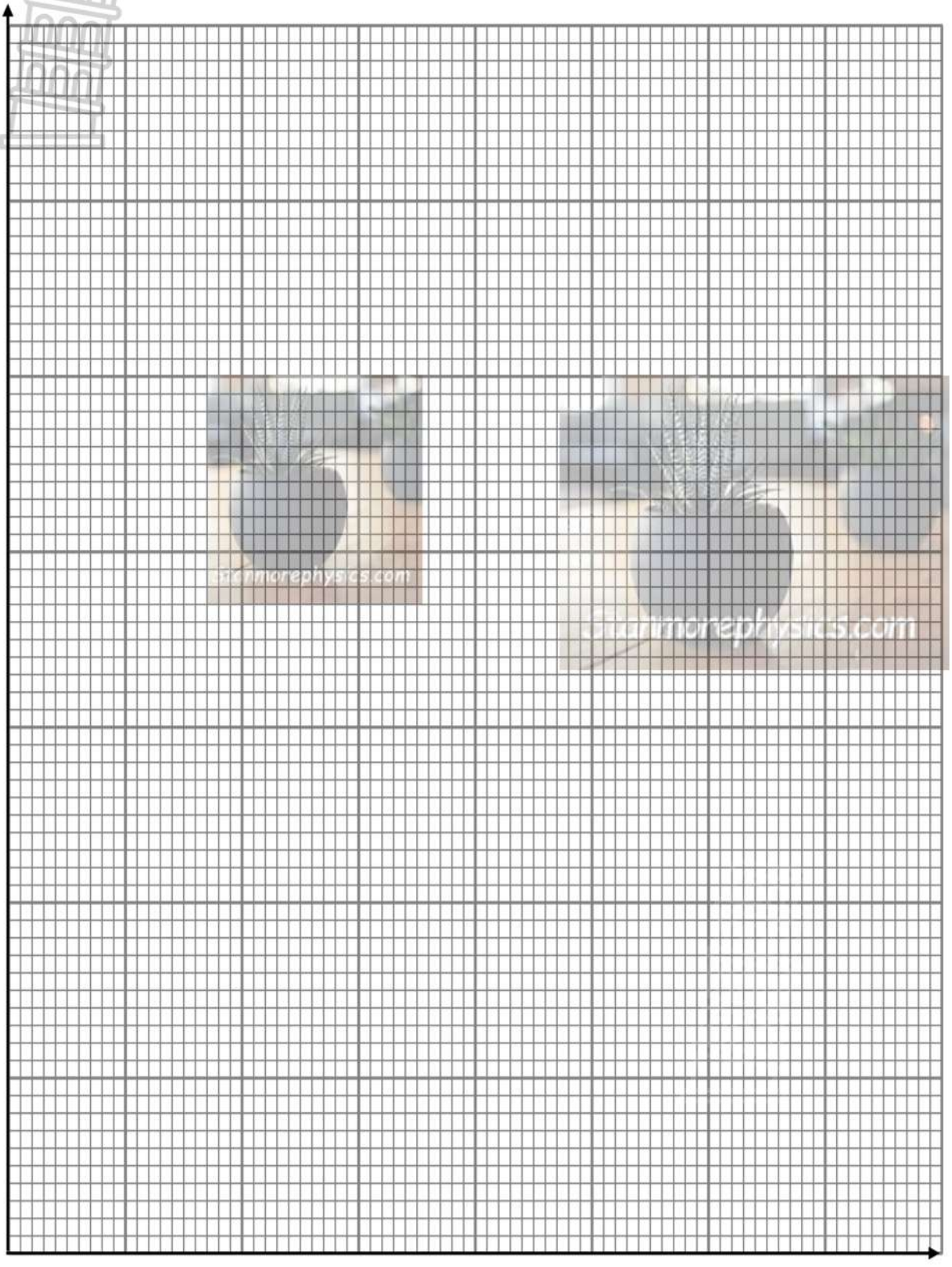
3.10 Formulate the conclusion for this investigation. (2)

[13]

Total Marks: 21

Learner's Surname and Name: _____

Use the graph paper to answer question 2.1.1



KWAZULU-NATAL PROVINCE
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NATURAL SCIENCES GRADE 9
TERM 2 TOPIC TEST NO. 4 MEMORANDUM
Topic: Acids and Bases
Marks: 21 **Time:** 21 minutes

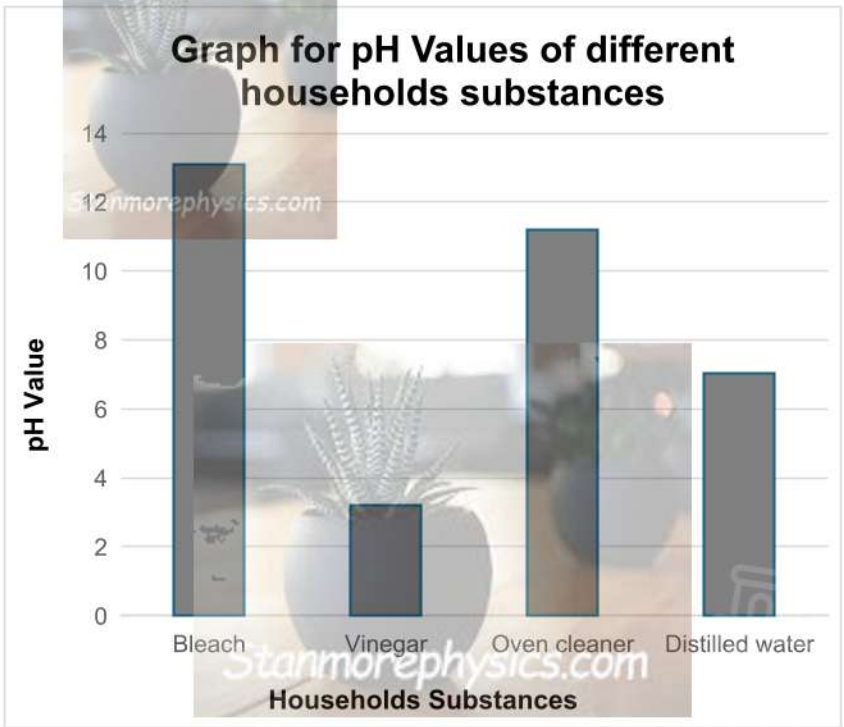
Question 1

1.1 C✓ (1)
[1]

Question 2

2.1

2.1.1



Rubric
Caption/Heading✓
labels for x-axis and y-axis✓
scale✓
accuracy of bars (1 mark for two correct bars) ✓✓ (5)

2.1.2 Bleach, ✓ because it has greater pH value. ✓ (2)

[7]

Question 3

3.1 MgO✓ (1)

3.2 Water or H_2O ✓ (1)

3.3 Sour taste
Corrosive
pH less than 7
Feel coarse when rubbed between the fingers (not smooth or soapy)
Bromothymol blue turns yellow / Blue litmus turns pink / Universal indicator turns red in an acid (ANY TWO) ✓✓ (2)

3.4 Use universal indicator / digital pH-meter✓ (1)

3.5 1(pH=1)✓ (1)

3.6 A solution is neutral / neither acid nor base. ✓ (1)

3.7 4 (pH=4) (1)

3.8 pH of hydrochloric acid✓ (1)

3.9 Volumev of the hydrochloric acid (200 ml) ✓ (2)
Mass/AmountV of the magnesium oxide (10 g) ✓

3.10 Possible answers:
The lower the pH of the HCl, the shorter the time for the MgO to react.
The lower the pH of the HCl, the higher the rate of the reaction.
The higher the pH of the HCl, the longer the time for the MgO to react.
The higher the pH of the HCl, the lower the rate of the reaction.
As the pH increases, the time increases.
As the pH decreases, the time decreases.
As the acidity increases / pH decreases, the rate increases.
As the acidity decreases / pH increases, the rate decreases. ✓✓ (2)

[13]

Total Marks: 21