

CHEMISTRY – 233/3

PAPER 3

PRACTICAL

2020 FORM 4 TERM 1 ENRTY EXAMS

TIME: 2 ¼ HOURS

NAME:.....ADM.NO:.....CLASS:.....

INSTRUCTIONS:

- a) Write your name, admission number and class.
- b) Answer all the questions in the spaces provided.
- c) Spend the first 15 minutes of the 2 ¼ hours to read the questions paper and ensure you have all the chemicals and apparatus that you may need.
- d) All working must be clearly be shown where necessary.
- e) Mathematical tables and silent calculators may be used
- f) Answer all the questions in English language.

For examiner's use only

| Questions | Maximum score | Candidates score |
|-----------|---------------|------------------|
| 1 | 20 | |
| 2 | 20 | |
| Total | 40 | |

1. You are provided with:-
- 2.86g of solid E, $\text{Na}_2\text{CO}_3 \cdot x \text{H}_2\text{O}$
 - Solution W, 0.1M hydrochloric acid
- You are required to-
- Prepare a dilute solution of $\text{Na}_2\text{CO}_3 \cdot x \text{H}_2\text{O}$
 - Determine the value of X in $\text{Na}_2\text{CO}_3 \cdot x \text{H}_2\text{O}$

Procedure:

Step 1

Place all the solid E in a 250ml volumetric flask. Add about 150ml of distilled water. Shake the mixture well until the solid dissolves. Add distilled water up to mark. Label this solution D.

Step 11

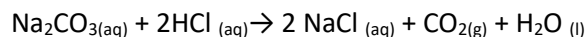
Using a pipette and pipette filler place 25.0cm^3 of solution D into a conical flask. Add two drops of the indicator provided. Fill the burette with solution W and titrate solution D. with solution W. Record your results in the table below. Repeat the titration two more times and complete the table below.

| | I | II | III |
|---|---|----|-----|
| Final burette reading(cm^3) | | | |
| Initial burette reading (cm^3) | | | |
| Volume of solution W used (cm^3) | | | |

(4mks)

- Calculate
 - Average volume of solution W used (1mk)
 - Moles of solution W, hydrochloric acid used. (2mks)

b) The equation for the reaction that took place is:



Calculate:

- Moles of solution D, $\text{Na}_2\text{CO}_3 \cdot x \text{H}_2\text{O}$ used (2mks)

- ii) Moles of solution D, $\text{Na}_2\text{CO}_3 \cdot \text{XH}_2\text{O}$ in 250cm^3 of solution (2mks)
- iii) Molarity of solution D, $\text{Na}_2\text{CO}_3 \cdot \text{XH}_2\text{O}$ (2mks)
- iv) Relative formula mass of $\text{Na}_2\text{CO}_3 \cdot \text{XH}_2\text{O}$ (3mks)
- v) The mass in grams of the water of crystallization in a litre of solution D (Na = 23, C = 12, O = 16, H = 1) (2mks)
- vi) The value of X in $\text{Na}_2\text{CO}_3 \cdot \text{XH}_2\text{O}$ (2mks)

2. a) You are provided with solid Y. Carry out the tests below and identify the ions.
- i) Add all solid Y in a boiling tube. Add about 10cm³ of distilled water. Divide the solution into 4 portions.

| ation | ces |
|-------|-------|
| (1mk) | (1mk) |

- ii) To the first portion add three drops of sodium hydroxide then in excess.

| ation | ces |
|-------|-------|
| (1mk) | (1mk) |

- iii) To the second portion add three drops of ammonium hydroxide then in excess

| ation | ces |
|-------|-------|
| (1mk) | (1mk) |

- iv) To the third portion add three drops of lead(II) nitrate and warm

| ation | ces |
|-------|-----|
| | |

| | |
|-------|-------|
| (1mk) | (1mk) |
|-------|-------|

v) To the forth portion add three drops of hydrochloric acid.

| | |
|-------|-------|
| (1mk) | (1mk) |
|-------|-------|

b) You are provided with solid X. Carry out the tests below.

i) Scoop half of solid X using a spatula and heat over non-luminous flame.

| | |
|-------|-------|
| (1mk) | (1mk) |
|-------|-------|

ii) Put the remaining solid X in a boiling tube and add about 10cm³ of distilled water. Divide the solution into 3 portions.

| | |
|-------------|------------|
| Observation | Inferences |
| | |

| | |
|-------|-------|
| (1mk) | (1mk) |
|-------|-------|

iii) To the first portion add 3 drops of universal indicator

| ation | ces |
|-------|-------|
| (1mk) | (1mk) |

iv) To the second portion add sodium carbonate provided.

| ation | ces |
|-------|-------|
| (1mk) | (1mk) |

v) To the third portion add three drops of acidified potassium manganate (VII) solution.

| ation | ces |
|-------|-------|
| (1mk) | (1mk) |