

# FORM 4 TERM 1 OPENER

# CHEMISTRY

NAME..... ADM NO.....

CLASS..... SIGN.....

INDEX NO..... DATE.....

**PAPER 3**

**TIME: 2 HOURS**

**Attempt all the questions in the spaces provided.**

**You have been provided with:**

- 0.5g Divalent  $MCO_3$  labeled P
- 0.5M hydrochloric acid labeled A
- 1.0M Sodium hydroxide labeled B
- Phenolphthalein indicator
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**PROCEDURE:**

- Weigh exactly 0.5g of a divalent metal carbonate,  $MCO_3$
- Put the weighed carbonate in a conical flask
- Add to it 30.0cm<sup>3</sup> of 0.5M hydrochloric acid solution A
- Add 2 – 3 drops of phenolphthalein indicator in the resulting solution.
- Titrate the solution against a 1.0M Sodium hydroxide solution until the colour of the solution just turns pink permanently.
- Record your results in the table below.
- Repeat the experiment three times to complete the table. (4 mks)

Titration	1	2	3
Final burette reading (cm <sup>3</sup> )			
Initial burette reading (cm <sup>3</sup> )			
Volume of the base used (cm <sup>3</sup> )			

1. Calculate the average volume of base used to neutralize the excess acid. (1 mk)

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2. Determine:
- (a) The number of moles of base used. (2 mks)
  
  - (b) (i) The volume of the acid that was neutralized by the base. (2 mks)
  
  - (ii) The number of moles of acid that reacted with the carbonate. (2 mks)
3. (i) Write the equation for the reaction between the acid and carbonate. (1 mk)
- (ii) Determine the number of moles of the carbonate in the sample. (2 mks)
- (iii) Determine the relative formula mass of the carbonate. (2 mks)
- (iv) Determine the relative atomic mass of M. (3 mks)

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2. You are provided with solid P. Carry out the tests below and record your observations and inferences.  
 - Put all solid P in a boiling tube and add about 5cm<sup>3</sup> of distilled water. Shake until all solid dissolves.

(a) Place about 2cm<sup>3</sup> portion of the solution in a test tube and add aqueous ammonia drop wise until in excess. (1 mk) (1 mk)

Observations	Inferences

(b) Dip a clean end of a glass rod into the remaining solution and then place it in the Bunsen burner flame. Note the colour of the flame above the glass rod. (1 mk) (1 mk)

Observations	Inferences

(c) Place about 2cm portion of the solution in a test tube of barium nitrate solution. Retain this content for the test in (d) below.

Observations	Inferences
(1 mk)	(2 mk)

(d) To the content in (c) above add 4 drops of 2m HNO<sub>3</sub> following by 2 drops of acidified potassium manganet (vii).

Observations	Inferences
(1 mk)	(1 mk)

3. You are provided with solid K. carry out the tests below and record your observation and inferences in the spaces provided.

(a) scoop a half portion of the solid using a clean metallic spatula and introduce it to a non-luminous flame of Bunsen burner to burn.

Observations	Inferences

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(1 mk)	(2 mk)
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(b) Put the remaining portion of solid K. in a boiling tube and add about 10cm<sup>3</sup> of distilled water. shake and divide the solution into three portion.

Observations	Inferences
(1 mk)	(1 mk)

(ii) To the 1<sup>st</sup> portion, add about 4 drops of acidified potassium manganite (Vii) solution.

Observations	Inferences
(1 mk)	(2 mk)

(iii) To the 2<sup>nd</sup> portion, add 3 drops of acidified potassium dichromate (vi) solution.

Observation	Inferences
(1 mk)	(1 mk)

(iv) To the 3<sup>rd</sup> portion, determine the PH using universal indicator paper.

Observations	Inferences
(1 mk)	(1 mk)

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