

SUNSHINE SECONDARY SCHOOL

**233/3
CHEMISTRY
PAPER 3
PRACTICAL
PRE MOCK 1 2017
MARCH 2017
2¹/₄HRS**

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

SIGNATURE.....INDEX..... DATE

INSTRUCTIONS

- ❖ Answer all the questions on the spaces provided
- ❖ All working must be clearly shown where necessary
- ❖ Calculations and mathematical tables may be used

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	11	
2	14	
3	15	
TOTAL	40	

1 You are provided with:

Solution M 0.2M hydrochloric acid,

Solution F containing 15.3g per litre of basic compound $G_2X \cdot 10H_2O$.

You are required to determine the relative atomic mass of G.

PRECEDURE:

Place solution M in a burette ,pipette 25cm^3 of solution F into a 250cm^3 conical flask. Add two drops of methyl orange indicator and titrate. Record your results in the table below. Repeat the procedure two more times and complete table I.

Table I

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

(4mks)

a) What is the average volume of solution M.?

(1mk)

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b) Given that one mole of F reacts with 2moles of M. Calculate the;

i) Number of moles the basic compound, $G_2X \cdot 10H_2O$ in the volume of solution F used.

(2mks)

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ii) Concentration of solution F in moles per litre.

(2mks)

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iii) Relative formula mass of the basic compound, $G_2X \cdot 10H_2O$.

(1mk)

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- iv) Relative atomic mass of G (Relative formula Mass of X=60 , atomic mass of H=1.0 , O=16.0). (1mk)
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2 You are provided with:

- 1 1.89g of solid P, solid P is adiabatic acid H₂X.
- 2 0.5M Solution of the dibasic acid , H₂X , Solution V.
- 3 Sodium hydroxide, Solution K.

You are required to determine:

- a)
 - i) the molar heat of solid P.
 - ii) the heat of reaction of one mole of the dibasic acid with sodium hydroxide.
- b) Calculate the heat of reaction of solid H₂X with aqueous sodium hydroxide.

PROCEDURE I.

Place 30cm³ of distilled water into a 100ml beaker. Measure the initial temperature of the water and record it in the table II below. Add all the solid P at once; stir the mixture carefully with the thermometer until all the solid dissolves. Measure the final temperature reached and records it in the table II

Table II

Final temperature (°c)	
Initial temperature (°c)	

(2mks)

- a) Determine the change in temperature ΔT_1 (1 mk)
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b) Calculate the:

- i) Heat change when H₂X dissolves in water, (Assuming the heat capacity of the solution is 4.2Jg⁻¹K⁻¹ and density is 1g/cm³) (2mks)
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ii) Number of moles of the acid that were used. (Relative formula mass of H_2X is 126) (1mk)

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iii) Molar heat of solution ΔH_1 solution of the acid H_2X . (1mk)

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PROCEDURE II.

Place 30cm^3 of solution V into a 100cm^3 beaker. Measure the initial temperature and record it in table III below. Measure 30cm^3 of sodium hydroxide, solution K. Add all of the 30cm^3 of t of solution K at once to V in the beaker. Stir the mixture with the thermometer. Measure the final temperature reached and record it in table III.

Table III.

Final temperature ($^{\circ}\text{C}$)	
Initial temperature ($^{\circ}\text{C}$)	

(1 ½ mks)

a) Determine the change in temperature, ΔT_2 . (½ mk)

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b) Determine the:

i) Heat change for the reaction (Assume the heat capacity of the solution is $4.2\text{Jg}^{-1}\text{K}^{-1}$ and density is 1g/cm^3) (2mks)

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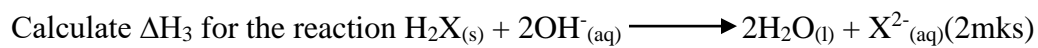
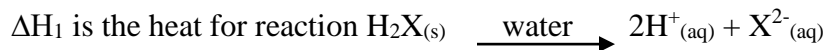
ii) Number of moles of the acid used (H_2X). (1mk)

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iii) Heat of reaction, ΔH_2 of one mole of the acid H_2X with sodium hydroxide (1mk)

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d) Given that,



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QUESTION 3A

a) You are provided with solid Q. Carry out the test indicated below and record your observations and deductions in the table below.

i) Place a spatula full of Q in a boiling tube. Add about 10cm³ of distilled water and shake. Divide the resultant mixture into 4 portions.

Observation	Deductions
(1mk)	(1mk)

b) To the first portion add Barium nitrate solution followed by dilute nitric acid.

Observation	Deduction
(2mks)	(1mk)

c) To the second portion add 2-3 drops of sodium hydroxide till in excess.

Observation	Deduction
(2mks)	(1mk)

d) To the third portion add 2-3 drops of ammonia solutions till in excess.

Observation	Deduction
(2mks)	(1mk)

e) To the 4th portion add Pb (NO₃)₂ solution

Observation	Deduction
(1mk)	(1mk)

QUESTION 3B

You are provided with liquid X. You are required to carry the test below.

a) Place about 1cm³ of substance X in a test tube. Add a small piece of sodium carbonate solid.

Observation	Deduction
(1mk)	(1mk)

b) To about 3cm³ of X in a boiling tube, add acidified potassium chromate (vi) and warm.

Observation	Deduction
(1mk)	(1mk)

c) To about 3cm³ of X add acidified potassium manganate (vii)

Observation	Deduction
(1mk)	(1mk)

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1. About 50cm³ of solution V
2. About 50cm³ of solution K
3. 1.89g of solid P oxalic acid accurately weighed and placed in a stopped container.
4. Thermometer
5. 5 dry test tubes in a test tube rack
6. Spatula
7. Bunsen burner
8. About 120cm³ of solution M
9. About 90cm³ of solution F
10. Liquid X-ethanol
11. Solid Q – 1g of solid zinc sulphate
12. Blue and red litmus papers.
13. A boiling tube.
14. Glass rod

Access to:

- a) Bunsen burner
- b) 2M sodium hydroxide with a dropper
- c) 2M Ammonium hydroxide
- d) Barium nitrate solution
- e) Lead nitrate solution
- f) Dilute nitric v acid
- g) Methyl orange with a dropper.
- h) Phenolphthalein indicator in a bottle dropper
- i) About 15cm³ of liquid X
- j) Acidified potassium dichromate (VI) with a dropper.
- k) Acidified potassium mangate (vii)

1. Solution V is a prepared by dissolving 63g of oxalic acid to make one litre of solution.
2. Solution K is prepared by dissolving 16g of sodium hydroxide pellets to make one litre of solution.
3. Solution M is prepared by dissolving 17cm³ of concentrated hydrochloric acid to make one litre of solution.
4. Solution F is prepared by dissolving 15.3g of hydrated sodium hydrogen carbonate to make one litre of solution.