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NAME: _____ **( ) DATE:** _____ **CLASS:** _____

QA1 – Thermal Decomposition of Solids & Flame Tests

PART 1: Thermal Decomposition of solids

Aim: To record the colour changes of the solid observed during the thermal decomposition of the solid and identify the gases given off during heating.

Apparatus and chemicals:

test tubes	safety goggles	ammonium chloride
test tube holder	wooden splints	copper(II) carbonate
test tube rack	limewater	lead(II) nitrate
spatula	red and blue litmus papers	zinc carbonate
dropper	distilled water	Bunsen burner

Procedure:

Conduct the tests on pages 2 & 3 on the thermal decomposition of solids labelled **P**, **Q, R** and **S**.

1. Place 3 spatula of the solid into a clean and **dry** hard glass test tube.

2. Light the Bunsen burner with the air hole **fully closed**. Upon lighting the Bunsen burner, adjust the air hole until it is **fully opened** to obtain a **non-luminous flame** for heating.

3. Adjust the gas tap to control the size of the flame.

4. Hold the test tube just below its mouth using a test tube holder.

5. Heat the sample in the test tube **gently first** for about 30 seconds before heating **very strongly** using a non-luminous flame until there is **no further change**.

For **gentle** heating:	move the test tube in and out of the flame.
For **strong** heating:	position the test tube at the hottest part of the flame and heat.

6. Test for any gas formed. [using litmus papers / limewater / glowing splint]

7. Observe and record the **colour changes** of the solid **on heating** and **on cooling**.

On **heating**, _____ *(to fill in colour)* solid **turns** / **melts** into a _____ *(to fill in colour)* solid / liquid.
On **cooling**, _____ *(to fill in colour)* solid **remains** / **turns** into a _____ *(to fill in colour)* solid.

8. During the course of heating, observe and record any **coloured gases / fumes** as well as **condensation** of any liquid at the mouth of the test tube.

On **heating**, _____ *(to fill in colour)* **gas / fumes** are observed.

On **heating**, droplets of _____ *(to fill in colour)* liquid are formed at the mouth of the test tube.

Observations

Solid	Test	Observation(s)	Identity of gas evolved (if any)
P	a) Heat the sample in the test tube gently first for about 30 seconds before heating very strongly flame until no further change is seen. b) While heating the sample strongly, test any gas evolved using moist red and blue litmus papers. c) Allow the heated sample to cool.	**On heating, _____ fumes are observed. _____ solid sublimes.** **Gas produced turn _____ _____.** **On further heating, gas produced turn _____ _____.** **On cooling, _____ _____ near the mouth of the test tube.**	
Q	a) Heat the sample in the test tube gently first for about 30 seconds before heating very strongly flame until no further change is seen. b) During the heating process, withdraw several samples of gas from inside the test tube using a teat pipette. Each time bubble the gas from the teat pipette through the limewater. c) Allow the heated sample to cool.	**On heating, _____ solid turns _____.** **Gas produced _____ _____ _____.** **On cooling, _____ solid turns _____.**	
R	a) Heat the sample in the test tube gently first for about 30 seconds before heating very strongly flame until no further change is seen. b) While heating the sample strongly, test any gas evolved using moist red and blue litmus papers, as well as using a glowing splint. c) Allow the heated sample to cool.	**On heating, _____ solid turns _____.** **_____ are observed.** **Gas produced turn _____ _____.** **Damp/moist red litmus paper _____.** **Gas produced _____ _____.** **On cooling, _____ solid turns _____.**	

Solid	Test	Observation(s)	Identity of gas evolved (if any)
S	a) Heat the sample in the test tube gently first for about 30 seconds before heating very strongly flame until no further change is seen. b) During the heating process, withdraw several samples of gas from inside the test tube using a teat pipette. Each time bubble the gas from the teat pipette through the limewater. c) Allow the heated sample to cool.	**On heating, _____ solid turns _____.** **Gas produced _____ _____.** **On cooling, _____ _____.**	

PART 2: Flame Tests

Flame tests can be used to identify a relatively small number of metal ions in a compound. In your syllabus, you are not required to know which metal ion gives what colour. However, you must know how to make observations when performing a flame test.

What to observe – The colour of the flame obtained.
For example: A pink flame was seen / The splint burns with a pink flame.

Aim: To perform flame tests on solids **A**, **B**, **C** and **D**.

Procedure:

1. Adjust the Bunsen burner to give a blue flame.
2. Moisten the end of a wooden splint with water and dip the moist end of the splint into solid **A**.
3. Place this end of the splint in the Bunsen burner flame.
4. Record your observations.
5. With a clean splint, repeat steps 1 – 4 with solids **B**, **C** and **D**.

Salt	Observation
A	**The splint burns with a _____ flame.**
B	
C	
D	