

JOHN GRAY HIGH SCHOOL

KS3 SCIENCE: YEAR 8

END OF TERM 1 TEST

CHEMISTRY: PHYSICAL AND CHEMICAL CHANGES

PAPER 2

Time : 45 mins

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of **THREE** questions.
2. Answer **ALL** questions.
3. Indicate your answers in the spaces provided.
4. Remember to read the questions properly before attempting to answer
5. You are permitted to use a calculator in this exam.

Name: _____

Teacher's Name: _____

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

1. a. Complete the sentences on states of matter by selecting the sentences words from the drop-down boxes.

Solids:

- cannot be _____, do not _____, and have a fixed _____ and _____.
- have a high _____.
- are made of _____ that are very close together.

Liquids:

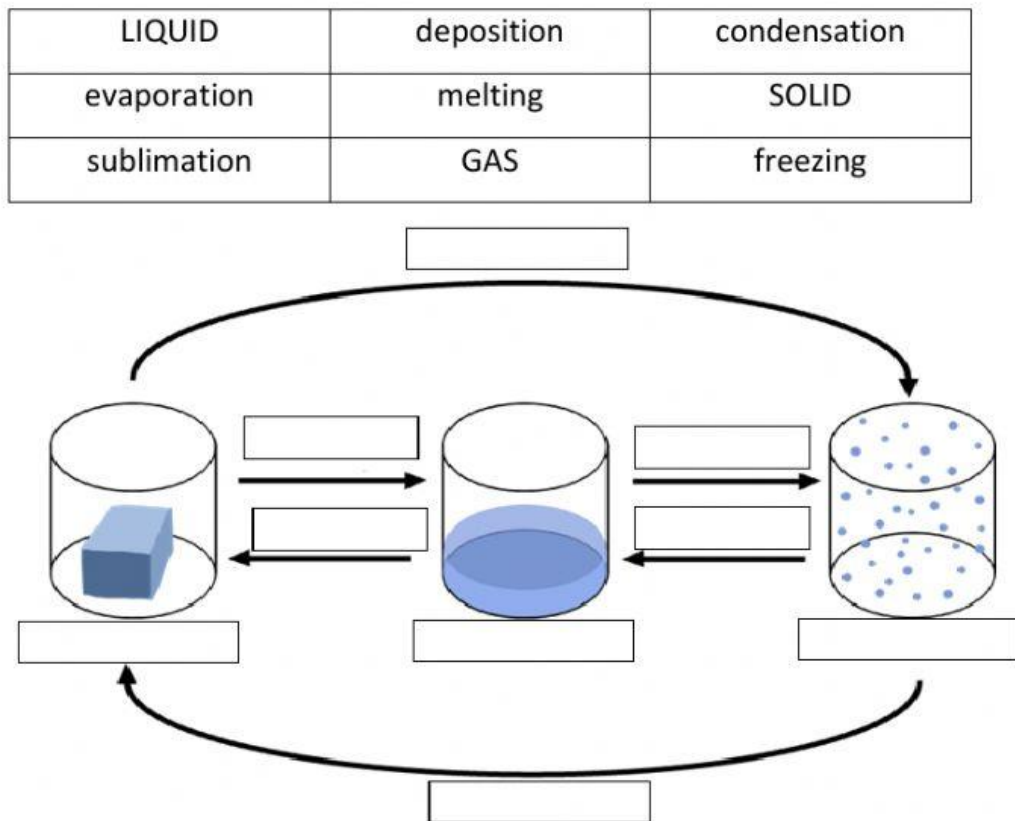
- cannot be _____ and have a fixed _____, _____ easily and do not have a fixed _____.
- are _____, but not as _____ as solids.
- are made of _____ that are close together.

Gases:

- are easy to _____, _____ very easily, and do not have a fixed _____ or _____.
- have a lower _____ than liquids.
- are made of _____ that are far apart.

(19 marks)

b. States of matter are able to change. Complete the diagram below by dragging the correct labels.



(9 marks)

c. Complete the sentences below about changing states.

Matter changes from one _____ to another when it is _____ or cooled.

When matter is heated, the particles gain _____ energy and _____.

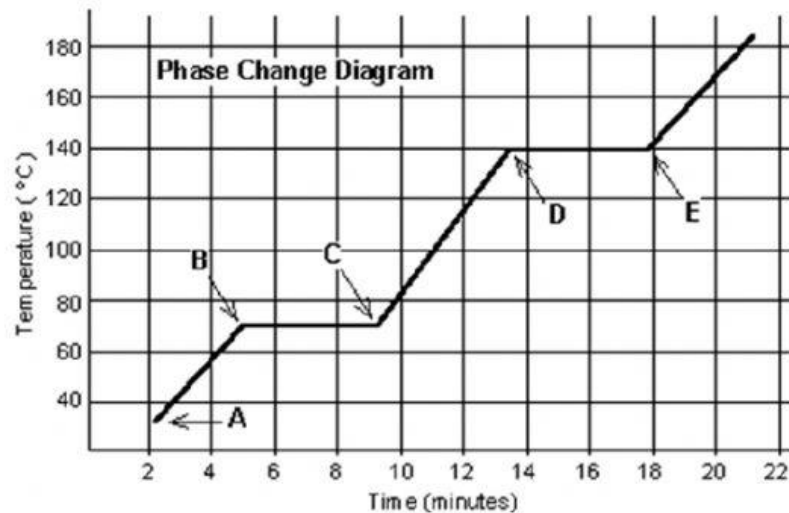
This is why when particles of a _____ are heated, they become particles in a liquid.

When heat is removed from matter, it _____. The particles lose _____ energy and come closer together. So, particles of a liquid turn back into particles in a

_____. Heating liquids turn them to _____ and _____ gases turn them to liquids.

(10 marks)

d. Below is a heating curve. Use information from the diagram to answer the questions.



- i. From A to B, the material is in the _____ state of matter.
- ii. From B to C, the process of _____ is taking place.
- iii. From C to D, the material is in the _____ state of matter.
- iv. From D to E, the process of _____ is taking place.
- v. Anything after E is in the _____ state of matter.
- vi. The boiling point of the substance is _____ °C.

(6 marks)

2. a. Drag the following word in the correct places to make the equation for calculating density. (3 marks)

Volume Mass Density

$$\boxed{} = \frac{\boxed{}}{\boxed{}}$$

- b. The density of water is 1 g/cm^3 . Will the following objects or substances FLOAT or SINK in a basin of water, based on their density. (5 marks)

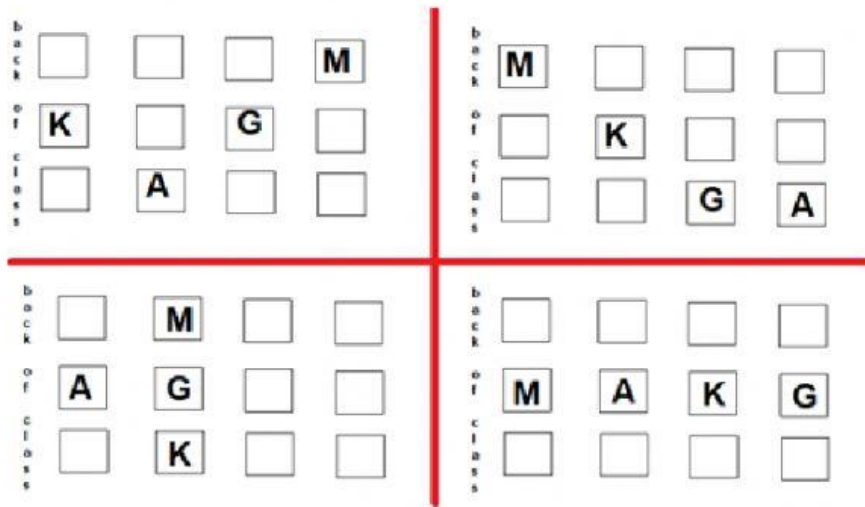
- I. Helium (0.18 g/cm^3) _____
- II. Chlorine gas (3.2 g/cm^3) _____
- III. Paper (0.4 g/cm^3) _____
- IV. Iron (7.9 g/cm^3) _____
- V. Honey (1.4 g/cm^3) _____

- c. Calculate the density of the following objects.

- i. Calculate the DENSITY of a ball if its mass is 20g and its volume is 5 cm^3 . (3 marks)

$$\begin{aligned} \text{density} &= \frac{\boxed{}}{\boxed{}} = \frac{\boxed{} \text{ g}}{\boxed{} \text{ cm}^3} \\ &= \boxed{} \text{ g/cm}^3 \end{aligned}$$

3. a. Maribella (M) sprayed her perfume at the back of the class. Kirkell (K) smelled it before Alexanderova (A) who smelled it after Gagaloosh (G). Which class arrangement shows how they were most likely sitting?



- b. How do the following factors affect how quickly particles will spread by diffusion?
- Increasing the size of the particles being diffused. _____
 - Diffusing a gas instead of a liquid. _____
 - Decreasing the temperature of the particles being diffused. _____
 - Increasing the number of particles being diffused. _____
 - Decreasing the size of the container or room in which diffusion occurs. _____

(6 marks)

c. Calculate the concentration of the following solids dissolved in water using the given equation.

- i. A mass of 30g of salt was dissolved in 60cm³ of water. Calculate the concentration of the salt solution.

$$\text{concentration} = \frac{\text{mass}}{\text{volume}}$$

$$\text{concentration} = \frac{\boxed{\text{g}}}{\boxed{\text{cm}^3}} = \boxed{\text{g/cm}^3}$$

d. Calculate the concentration of the following liquids dissolved in water using the given equation.

- i. A volume of 75cm³ of acid was mixed with 300cm³ of water. Calculate the percentage concentration of the acid solution.

$$\text{concentration} = \frac{\text{volume acid}}{\text{volume water}} \times 100$$

$$\text{concentration} = \frac{\boxed{\text{cm}^3}}{\boxed{\text{cm}^3}} \times 100 = \boxed{\%}$$

(6 marks)

4. a. Complete the table below about the features of physical and chemical changes in science. **(4 marks)**

PHYSICAL CHANGES	CHEMICAL CHANGES

- b. Are the following examples of physical or chemical changes? **(8 marks)**

- i. Melting butter then allowing to harden again. _____
- ii. Iron rusting when exposed to oxygen. _____
- iii. Water freezing to form ice. _____
- iv. Breaking a mirror. _____
- v. Frying fish. _____
- vi. Wetting a sheet of newspaper with water. _____
- vii. Making cheese from milk. _____
- viii. Mixing salt and water. _____

- c. Complete the passage about acids and bases.

Acids release _____ in water. They taste _____ and turn _____ litmus paper _____. Bases are _____ to the touch and turn _____ litmus paper _____. Pure water is said to be _____. **(4 marks)**

- d. Answer the questions based on the pH scale shown below. **(4 marks)**

14	Liquid drain cleaner, Caustic soda
13	bleaches, oven cleaner
12	Soapy water
11	Household Ammonia (11.9)
10	Milk of magnesium (10.5)
9	Toothpaste (9.9)
8	Baking soda (8.4), Seawater, Eggs
7	"Pure" water (7)
6	Urine (6) Milk (6.6)
5	Acid rain (5.6) Black coffee (5)
4	Tomato juice (4.1)
3	Grapefruit & Orange juice, Soft drink
2	Lemon juice (2.3) Vinegar (2.9)
1	Hydrochloric acid secreted from the stomach lining (1)
0	Battery Acid

- What range of pH are basic?
pH _____ to pH _____
- What range of pH are acidic?
pH _____ to pH _____
- What is neutral pH? pH _____
- What is the pH of the following substances?
 - Soapy water is pH _____
 - Black coffee is pH _____
 - Battery acid is pH _____
 - Pure water is pH _____
 - Caustic soda is pH _____

- e. When acids and bases react completely with one another to form a salt and water this process is called _____. **(1 mark)**

- f. What salt is formed when the following acids and bases react completely? Drag to correct answers into place

Calcium	Nitric	Sulphate	Sodium	Iron
Sulphuric	Chloride	Titanium	Magnesium	Nitrate

- Sodium hydroxide + Hydrochloric acid → _____ + water
- Calcium hydroxide + Nitric acid → _____ + water
- Magnesium hydroxide + Sulphuric acid → _____ + water
- _____ hydroxide + _____ acid → Iron nitrate + water
- _____ acid + _____ oxide → Titanium sulphate + water

(5 marks)