

1st Year Science, Christmas 2019

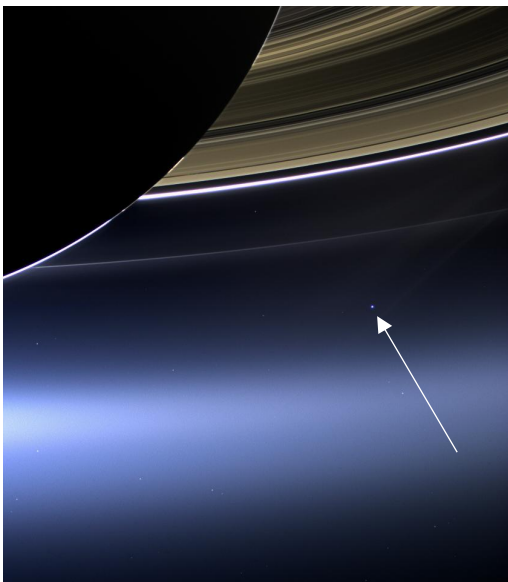
Time allowed: 1 ½ hours

Mr. A. Goodison

Student Name _____

Answer all questions in the spaces provided.

Good luck!



Question	Marks	Awarded
1	15	
2	21	
3	45	
4	42	
5	18	
6	15	
7	21	
8	30	
Total	207	
Grade descriptor		

A photo of the planet Saturn, taken by the Cassini space probe. The tiny bright dot at the arrow is Earth.

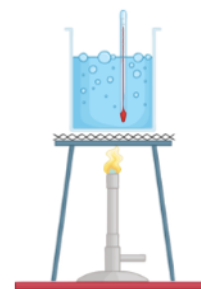
Junior Cycle	
Percentage	Grade Descriptor
≥ 90 to 100	Distinction
≥ 75 and < 90	Higher Merit
≥ 55 and < 75	Merit
≥ 40 and < 55	Achieved
≥ 20 and < 40	Partially Achieved
≥ 0 and < 20	Not Graded (NG)

Question 1. (15 marks)

Lab safety

In science we often need to heat water.

Name two safety precautions which you would normally carry out while doing this. (6)



1.

2.

Name a piece of lab equipment which could be used to heat the water (3)

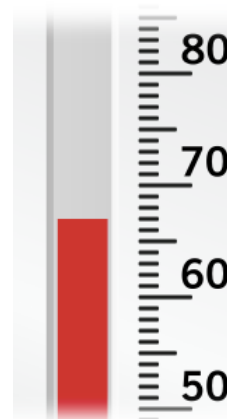
Name: _____

Name a piece of lab equipment which could be used to measure the temperature. (3)

Name: _____

During the experiment you measured the temperature. What is the temperature reading shown on this measuring instrument (the unit is °C)

Temperature _____ (3)



Question 2 (21 marks)

Some students measured the area of their school journal. The results are shown in the table below.

Name	Area of Journal (cm ²)
John	408
Isabelle	419
Weronika	402
Benjamin	1209
Janet	397

From the table above, which student do you think might have made a mistake and why?

Name of student _____ (3)

Explain why you picked this student: (3)

None of the students got the same answer for the area of their journals. Suggest a reasons why this might have happened. (3)

1. _____

Separating Mixtures

Identify which separating method should be used for the mixtures listed below (12)

Separating methods; **Distillation, Evaporation, Filtration, Chromatography**

To separate sand and water use _____

To separate salt and water so that you have a sample of salt use _____

To get pure drinking water from salt water use _____

To separate pen ink into its different colours use _____

Question 3 (45 marks)

Complete the table below for the instruments shown. (18)

In each case, state what physical quantity the instrument measures. Also state the unit used for that measurement. (Some parts of the table are already completed for you)



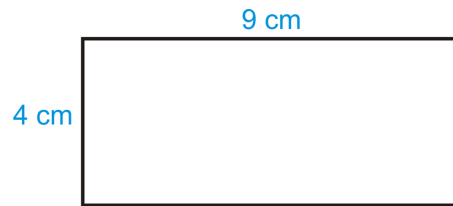
Instrument	Quantity measured	Unit
Metre stick		
Stopwatch		
Graduated cylinder		
Thermometer		°C
Trundle wheel		
Mass balance	Mass	Kilograms (kg)

The average mass of a baby is 3.5 kg at birth and 8 kg at 1 year of age. Calculate how much mass a baby usually gains over the year.

Answer _____ (6)

Unit _____ (3)

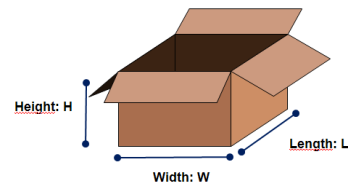
Calculate the area of a rectangle of length 9 cm and width 4 cm.



Answer _____ (6)

Unit _____ (3)

Calculate the volume of a box of length 2 m, width 4 m and height 2 m.



Answer _____ (6)

Unit _____ (3)

Question 4 (42 marks)

Your science teacher has asked you to find the **volume** of a metal bolt using one of two methods.

Method 1 uses a graduated cylinder and water to find the volume

Method 2 uses the same equipment as method A, but also uses an overflow can (sometimes called a displacement can) to find the volume.

Describe, with a labelled diagram, one of the methods used to find the volume of the bolt:

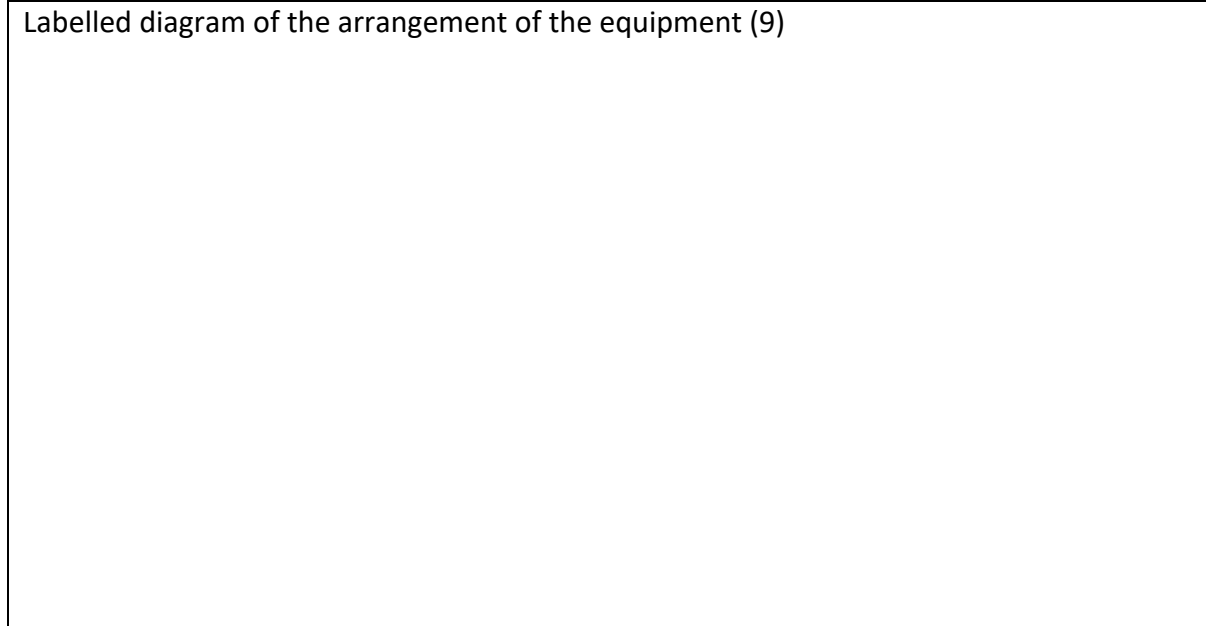
Method (1 or 2)?

Describe the procedure (more writing space on next page) (9)



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Labelled diagram of the arrangement of the equipment (9)



You find the **volume** of the bolt to be **41 cm³**.

Your science teacher then asks you to figure out **what type of metal** the bolt is made from by determining its **density**.

You measure the **mass** of the bolt to be: **321.85 g**

Q. What could you have measured the mass of the bolt with?

Answer _____(3)

Use the formula below to calculate the density of the bolt

$$Density = \frac{Mass}{Volume}$$

Density of the bolt _____ (6) Unit _____ (3)

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Use the density of the bolt and the table below to identify which type of metal the bolt is made from.

Metal	Density (g/cm³)
Aluminium	2.712
Brass	8.52
Cast iron	7.3
Copper	8.94
Gold	19.32
Iron	7.85
Lead	11.34
Lithium	0.534
Mercury	13.593
Nickel	8.908
Platinum	21.4
Silver	10.49
Sodium	0.971
Steel	7.85
Tin	7.28
Titanium	4.5
Tungsten	19.6
Zinc	7.135

Type of metal the bolt is made from _____ (3)

The density of water is 1 g/cm³. Name one metal in the table that will float on water?

_____ (3)

Explain why this metal will float on water.

_____ (6)

Question 5 (18)

A car entering the motorway increased its speed from 17 m/s to 35 m/s in 9 seconds. Use the space below and the equation to calculate its acceleration.

$$\text{Acceleration} = \frac{\text{Change in speed}}{\text{Time}}$$

Answer _____ (6) Unit _____ (3)

At the 2015 Tennis Open, Serena Williams hit a serve, which was faster than the fastest serve from the men's champion Novak Djokovic.

If the **distance** to her opponent was **24 meters (m)** and the ball took a **time** of **0.42 seconds (s)** to reach her opponent what was the **speed** of the ball?



$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

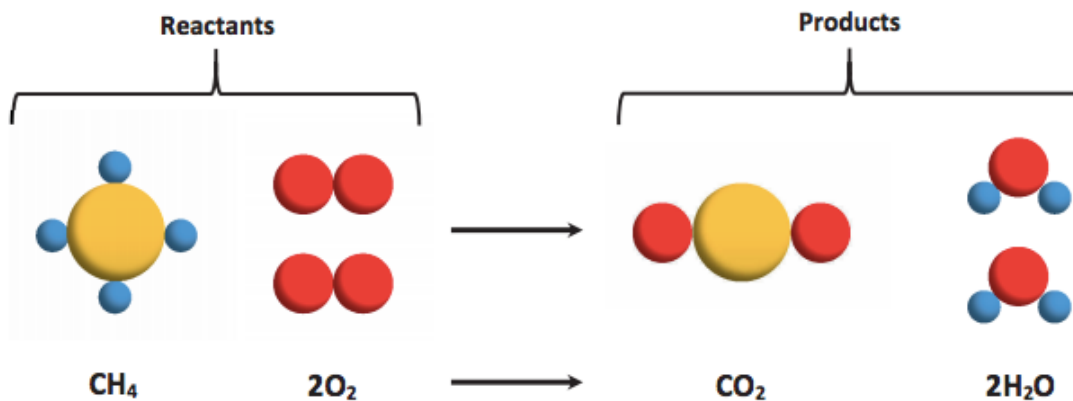
Answer _____ (6) Unit _____ (3)

Question 6 (15 marks)

Natural gas contains methane (CH₄). Methane is a fuel.

Methane burns in oxygen to produce carbon dioxide and water.

The diagram below represents the reaction.



(a) Count the number of each type of atom in the products to complete the table below. (3)

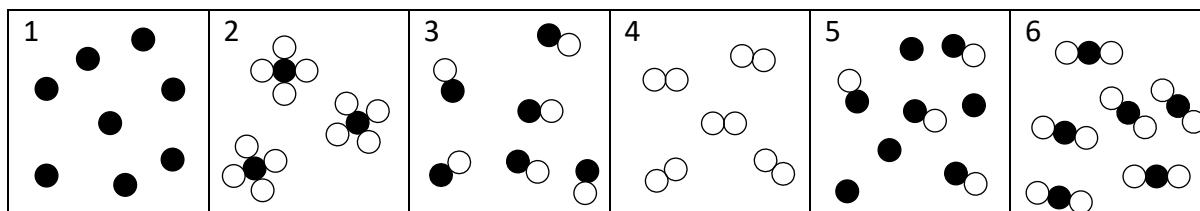
Element	Type of atom	Number of atoms in reactants	Number of atoms in products
Carbon		1	
Hydrogen		4	
Oxygen		4	

(b) Mass is conserved (the same) during this reaction. What evidence is there for this? (6)

(c) The burning of methane is an example of a chemical change. Describe one difference between a physical change and a chemical change. (6)

Question 7 (21 marks)

Look at the diagrams below and decide whether each one represents the particles in an **element, compound or mixture**. (12)

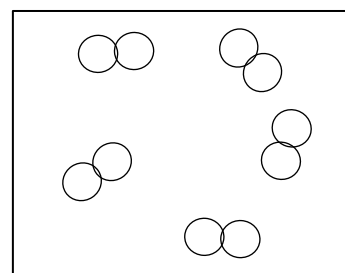
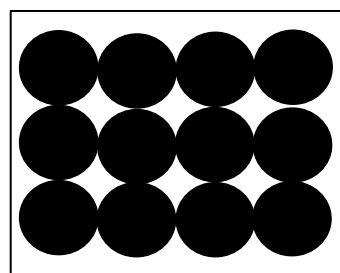


1	4
2	5
3	6

Aluminium

Chlorine

The diagrams on the right show the arrangement of particles in the elements aluminium and chlorine at room temperature.



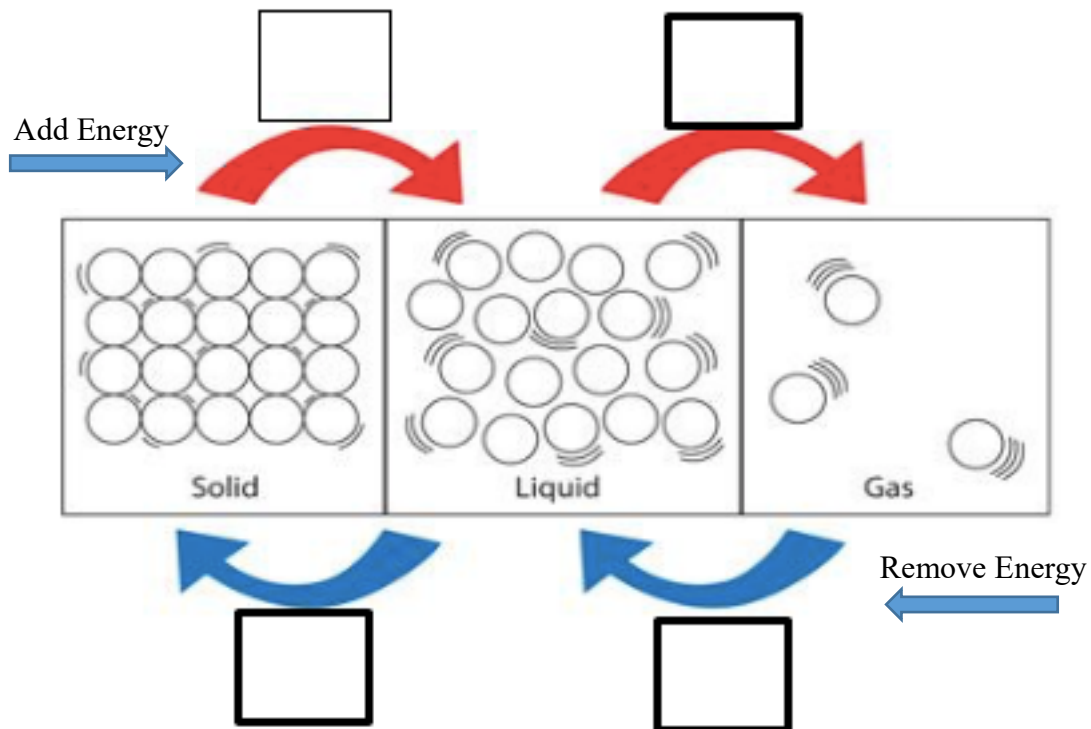
What evidence is there in the diagrams to support the classification of these substances as elements? (3)

Which of these elements (aluminium or chlorine) is a solid at room temperature? Justify your answer. (6)

Question 8 (30 marks)

There are three states of matter; solid (e.g. ice), liquid (e.g. water) and gas (e.g. steam). For each state of matter the particles are arranged differently as shown in the diagram below.

Fill in the correct letter into each box for the changing of one state of matter to another. (12)
 A = Freezing B = Boiling C = Condensation D = Melting



What **state or states** of matter (eg. **Solid, liquid or gas**) does each statement describe (18)

This state has no definite volume. _____

These states have no definite shape _____ and _____

This state is easily squashed (compressed) _____

In this state the particles are far apart _____

In this state the particles can vibrate but not move past each other _____

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If you are finished early and have checked all of your answers, colour in the picture below.

