

2nd Year Science, Christmas 2018

Time allowed: 1 ½ hours

Mr. A. Goodison

Student Name _____

Answer all questions in the spaces provided.

Good luck!



Question	Marks	Awarded
1	18	
2	53	
3	51	
4	24	
5	30	
6	42	
Total	218	
Grade descriptor		

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

Question 1 (18)

The cartoon below shows some students working in a school lab. List the safety hazards and for each hazard, give a possible solution or rule which should be followed to make the situation safe.

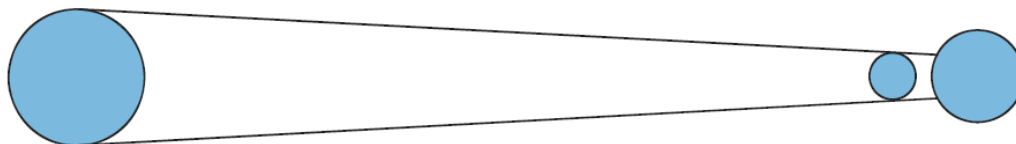


From the picture **list three** Hazards in the lab and state one way of reducing the risk of harm for each hazard (18)

Safety Hazard	Solution or rule

Question 2 (53)

The diagram below shows a simple model of a solar eclipse (an eclipse of the Sun). In the diagram, write the letter **E** for Earth, **M** for The Moon and **S** for The Sun (9)



Two weeks before or after a solar eclipse sometimes there is a lunar eclipse. Draw a labelled diagram to show a model of a lunar eclipse. (6)

The following image (Image 1) gives the different phases of the moon



Image 1: Moon Phases

The next image (Image 2) below shows the path of the Moons orbit around the Earth and the position of the sun (not to scale). Using both Image 1 and 2, Draw a dot on the Moons orbit to represent the Moon for each phase of the Moon. The waxing crescent moon has been done as an example. (14)

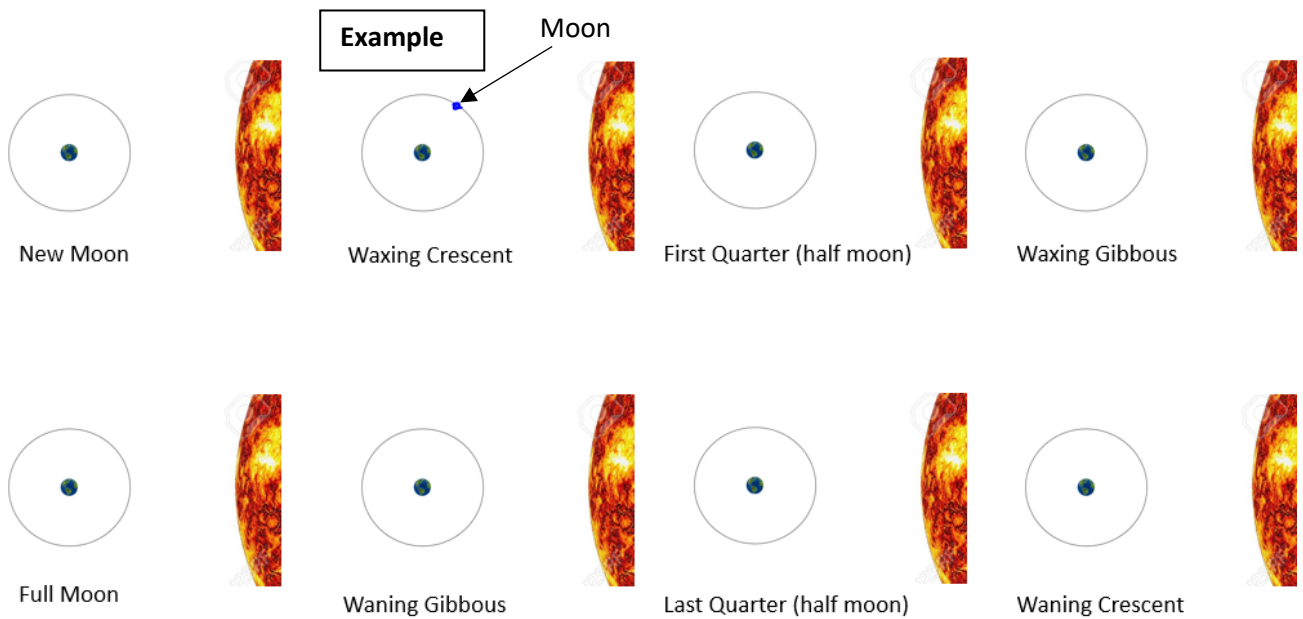


Image 2. Moon orbit position

Why can we see the Moon even though it does not produce any light?

(3)

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Below is an image (Image 3) of the Earth and Sun (not to scale). The Earth is in two different positions (**A** and **B**) at different times of the year.

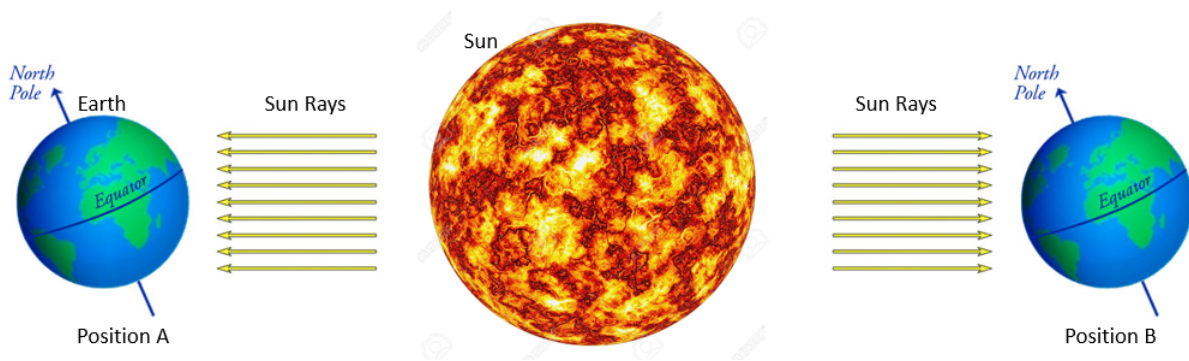


Image 3: Sun rays striking Earth at different times of the year

Ireland is in the Northern Hemisphere and Australia is in the Southern Hemisphere. What season (either **Summer** or **Winter**) are these countries in for the below questions.

Ireland **season** in position A _____ (3)

Australia **season** in position A _____ (3)

Explain your answer

_____ (3)

Ireland season in **position B** _____ (3)

Australia season in **position B** _____ (3)

How many months would it take Earth to travel from position A to position B? _____ (3)

How long does it take for the Earth to rotate on its axis once? _____ (3)

Question 3 (51)

Some chemical reactions proceed quickly while some proceed at a slower rate. The passage below explains the factors that speed up the rate of a reaction.

The terms below are missing from the passage.

Collisions **Activation energy** **Temperature** **Concentration** **Catalyst**

In the spaces provided, write the missing terms. (15)

_____ is a measure of the amount of particles in a solution.
Surface area is a measure of how much solid is exposed to reaction, and therefore how many _____ take place
_____ affects the energy that particles have and how quickly they collide. It also affects how effective collisions are.
The energy required for any reaction to take place is called _____. The presence of a _____ speeds up a chemical reaction. It works by lowering the activation energy.

A student carried out an experiment to investigate the effect of temperature on the rate of production of a certain gas. The first reaction happened at 20 °C and the second one at 30 °C.

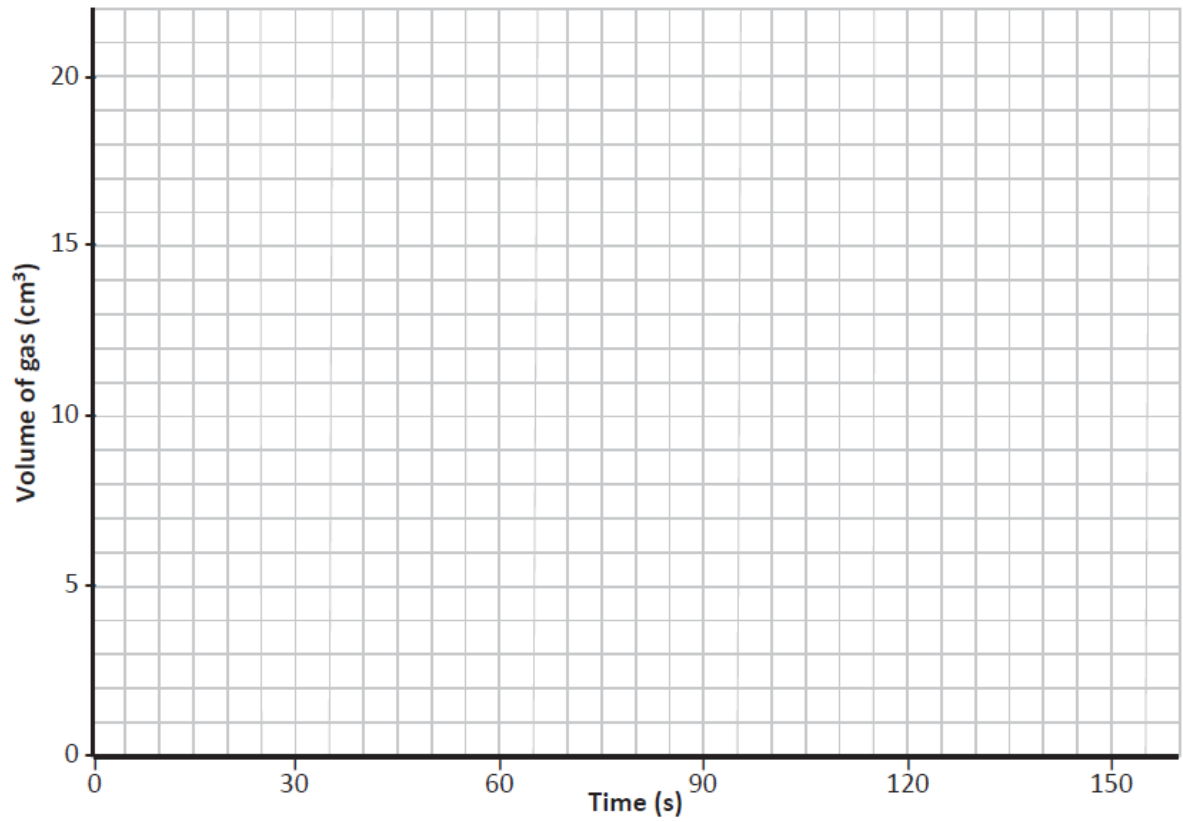
In both cases the gas produced was passed through water as it was collected. This was to ensure that the gas was always at room temperature (a constant) when its volume was measured.

The student recorded the following results:

Time (s)	Volume of gas (cm ³) for reaction at 20 °C	Volume of gas (cm ³) for reaction at 30 °C
0	0	0
30	7	10
60	13	16
90	17	19
120	19	20
150	20	20

Using the graph paper below, draw graphs for both sets of results (24)

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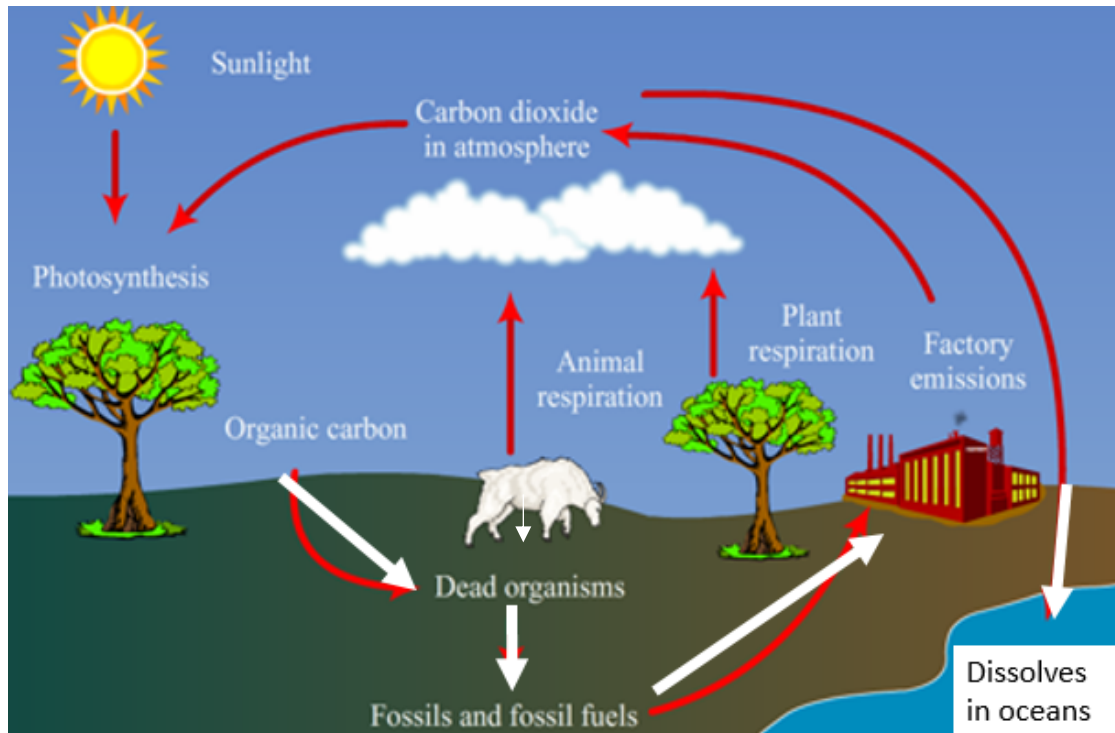
State **two** conclusions the student could have drawn from the results (12)

1 _____

2 _____

Question 4 (24)

The diagram below shows the carbon cycle.



Name the carbon containing gas that living things produce during respiration _____(3)

Name the process that involves the intake of carbon dioxide by green plants _____(3)

List **two** ways carbon dioxide is removed from the atmosphere (6)

1 _____

2 _____

List two ways carbon dioxide is released into the atmosphere. (6)

1 _____

2 _____

List two places carbon may be stored in the carbon cycle (6)

1 _____

2 _____

Question 5 (30)

The diagram below shows the periodic table

Use the diagram to identify and example (by symbol or name) to match each description in the table below. (12)

Description	Example
An element that has a full outer shell	
An element that has 1 electron in its outer shell	
An element that has 3 electrons in its outer shell	
An element that has 7 electrons in its outer shell	

Use the periodic table to predict the ratio of atoms and the chemical formula for each of the compounds listed. (18)

Compound	First element	Second element	Ratio	Formula
Water	Hydrogen (H)	Oxygen	2:1	H ₂ O
Hydrochloric acid	Hydrogen (H)	Chlorine (Cl)		
Magnesium chloride	Magnesium (Mg)	Chlorine (Cl)		
Ammonia	Nitrogen (N)	Hydrogen (H)		

Question 6 (42)

Match each of the following sub-atomic particles to their descriptions in the table below (9)

	Electron	Neutron	Proton
Description			
Positively charged			
Negatively charged			
No charge			

Which two sub-atomic particles make up the nucleus of an atom? (6)

1. _____
2. _____

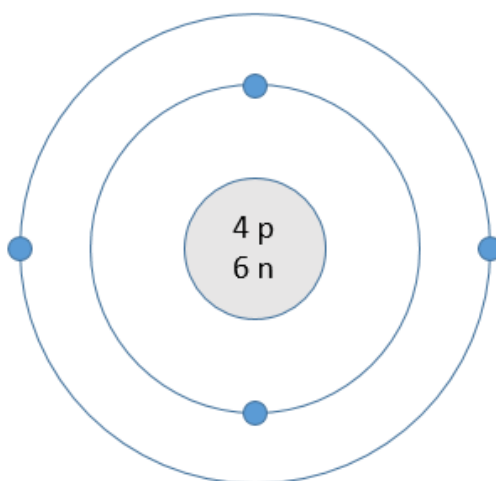
Which two sub-atomic particles have the same mass? (6)

1. _____
2. _____

Which sub-atomic particle has the lowest mass? (3)

Answer _____

The image below shows the Bohr model of an atom.



State the atomic number of the atom _____ (3)

State the mass number of the atom _____ (3)

What do the dots on the circles represent? _____ (3)

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Using the periodic table, identify the element that is made up of this type of atom. Justify your answer (6)

Explain why it is difficult for scientists to study atoms. (3)

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

