1st 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	27	
2	24	
3	36	
4	36	
5	12	
6	24	
Total	**154**	
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. Lab Safety. (27)

The cartoon below shows some students working in a school lab. List 5 safety hazards and for each hazard, give a possible solution or rule which should be followed to make the situation safe **(10).**

From the picture **list three** dangerous behaviours in the lab and explain why you think they are dangerous (18)

Safety Hazard	Solution or rule

You are going to light a Bunsen burner. From the table below choose the **correct order** the **safety precautions** should be carried out. **(6)**

A. Turn on gas supply	B. Put away books and bags	C. Connect Bunsen burner to the gas
D. Light the Bunsen Burner	E. Put on safety goggles	F. Tie back hair

Correct order filled in here.

1.	4.
2.	5.
3.	6.

If the flame from the Bunsen burner **goes out** but the gas is **still on** should you tell the teacher first or turn the gas off first?

Answer_____ **(3)**

Measurement and units

Question 2 (24)

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

Name	Area of Journal (cm²)
John	408
Isabelle	419
Ellie	402
Fia	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 **two** reasons why this might have happened. **(6)**

1._____
_____

2._____
_____

To convert from degrees Celsius (°C) to Kelvin (K), the SI unit of temperature, 273 is added. With this knowledge complete the table below. **(12)**

Value	Degrees Celsius (°C)	Calculation	Kelvin (K)
Room Temperature	20	*Example: 20 + 273*	*Example: 293*
Body Temperature	37		
Boiling water	100		
Freezing point of water	0		

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Question 3 (36)

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		Degrees Celsius (°C) or Kelvin (K)
Trundle wheel		
Mass balance	Mass	Kilograms (kg)

Derek measures his mass on the bathroom scales at night and finds that it is 72.0 kg. He then goes to sleep. First thing in the morning he weighs himself again and finds that he now has a mass of 71.85 kg. Calculate how much mass Derek lost while asleep.

Answer _____ (6)
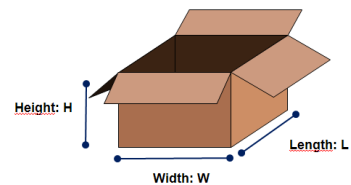Unit_____

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

9 cm

4 cm
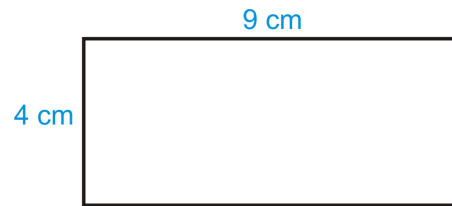
Answer _____ (6)
Unit_____

Calculate the volume of a box of length 20 cm, width 25 cm and height 30 cm.

Height: H

Length: L

Width: W

Answer _____ (6)
Unit_____

Density

Question 4 (36 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 (9)

_____

_____

_____

_____

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_____

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_____

Labelled diagram of the experiment (9)

You find the **volume** of the bolt to be **36 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: **162 g**

Use the formula below to calculate the density of the bolt
$$Density = \frac{Mass}{Volume}$$

Density of the bolt_____ (6)

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 your answer
_____
_____(6)

Speed and Acceleration

Question 5 (12)

A car entering the motorway increased its velocity from 15 m/s to 33 m/s in 9 seconds. Use the space below and the equation to calculate its acceleration.

$$Accleration = \frac{Change\ in\ velocity}{Time}$$

Answer_____(6)
Unit_____

Elaine Thompson was the first female athlete in 28 years to win the 100 m and 200 m final at the same Olympic Games. Her time for the 200 m race was 21.78 s. Use the speed formula to calculate her speed for the race

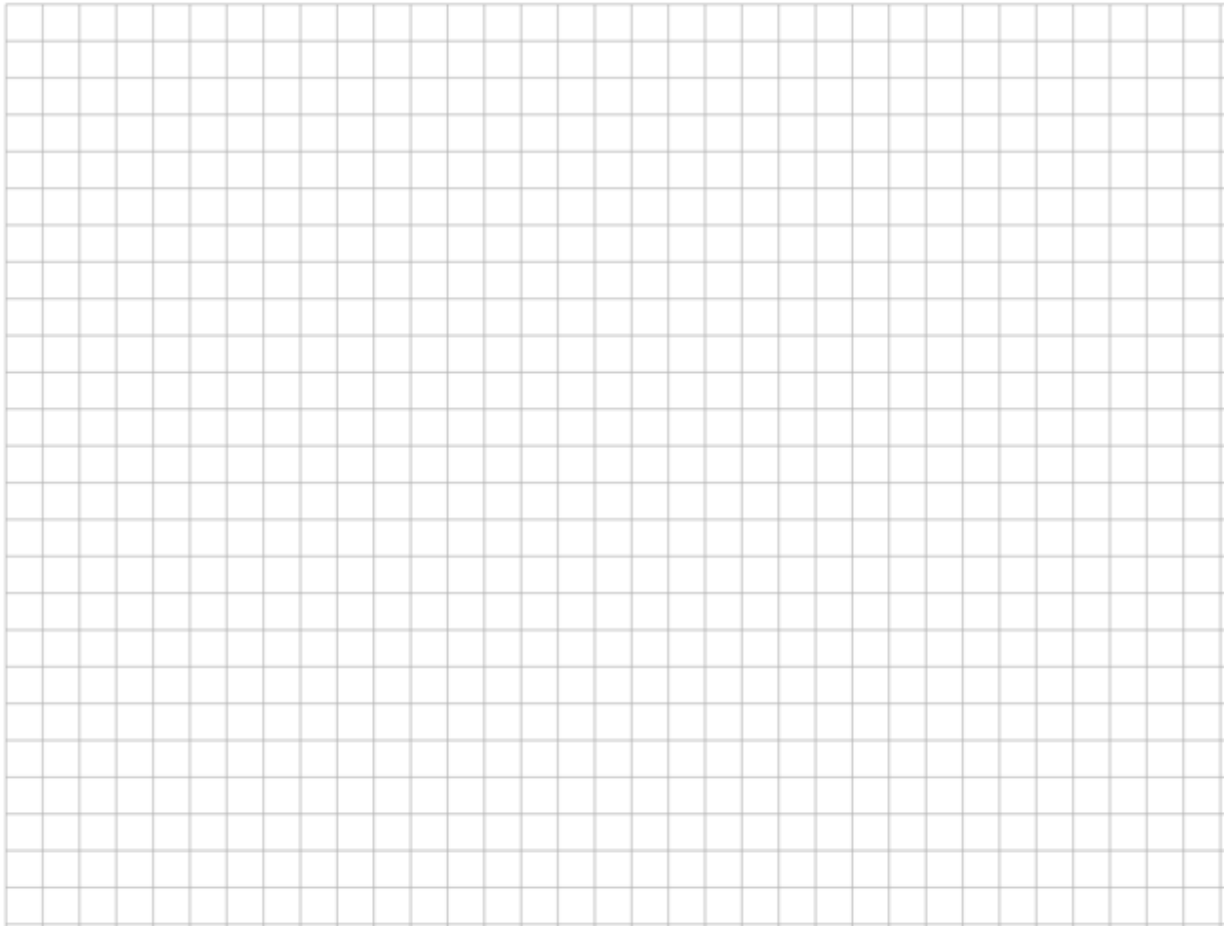$$Speed = \frac{Distance}{Time}$$

Answer_____(6)

Unit_____

Question 6 (24)

The table shows the distances travelled at different times for a girl running

Distance (m)	0	1	2	3	4	5
Time (s)	0	5	10	15	20	25

Using the graph paper draw a distance-time graph of her motion, putting **time** on the x-axis **(12)**:

Use your graph to find

- the time taken to run 8 m_____ (3)

- The distance travelled in 3.5 seconds _____(3)

Calculate the speed of the runner

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

Answer_____(6)

Unit_____

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