Marking scheme

2nd Year Science, Summer 2021

Mr. A. Goodison

Student Name _____

Periodic table of the elements

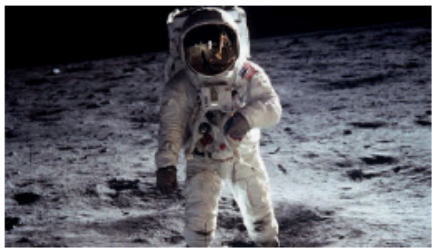
1												13	14	15	16	17	18
1 H 1.008	2																2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	3	4	5	6	7	8	9	10	11	12	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.41	31 Ga 69.72	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (97.90)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.8	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209.0)	85 At (210.0)	86 Rn (222.0)
87 Fr (223.0)	88 Ra (226.0)	89 Ac (227.0)	104 Rf (261.1)	105 Db (262.1)	106 Sg (266.6)	107 Bh (264.1)	108 Hs (277.0)	109 Mt (268.1)	110 Ds (271.0)	111 Rg (272.2)	112 Uub (285.0)	113 Uut*	114 Uuq (289.0)	115 Uup*	116 Uuh (289.0)	117 Uus*	118 Uuo (293.0)

Question	Marks	Awarded
1	13	
2	8	
3	7	
4	9	
5	6	
6	5	
7	14	
Total	**62**	
Grade descriptor		

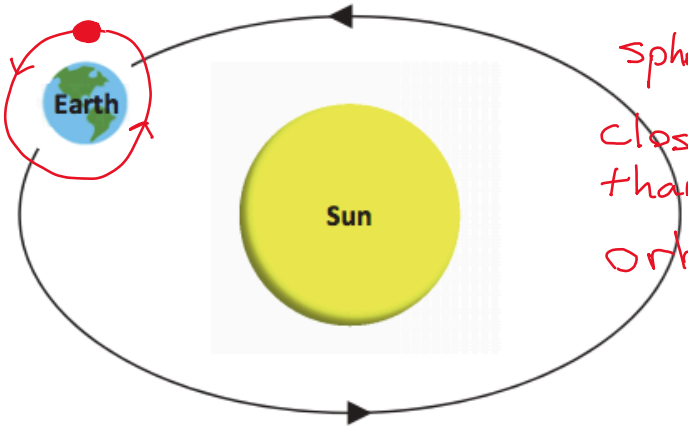
Junior Cycle	
Percentage	**Grade Descriptor**
≥ 90 to 100	Distinction
≥ 75 and < 90	Higher Merit
≥ 55 and < 75	Merit
≥ 40 and < 55	Achieved
≥ 20 and < 40	Partially Achieved
≥ 0 and < 20	Not Graded (NG)

Question 1

2019 marks the 50th anniversary of man's first landing on the Moon. Since then there have been a number of other missions to the Moon.



(a) The diagram below shows the Earth orbiting the Sun. Complete the diagram to show the shape, location and motion of the Moon in the Earth-Sun-Moon system. (3)



spherical moon (1)

closer to Earth than the sun (1)

orbit drawn (1)

(b) At the time of the first landing, the Moon was in a waxing crescent phase as seen from Earth. The images below show different phases of the Moon in sequence, from left to right. Place a tick (✓) in the box beneath the image which shows the Moon in a waxing crescent phase. (1)

☐ ✓ ☐ ☐ ☐

Shade in the image of the Moon on the left to illustrate the next phase of the Moon in the sequence above. (1) (1)

(c) On January 2nd 2019, the Chinese Chang'e-4 lander touched down on the far side or 'dark side' of the Moon.

Explain why this side of the Moon is never visible from Earth. (2)

Because the moons rotational period (1) is the same as its orbital period (1)

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

It reflects the light from the Sun (1)

(1)

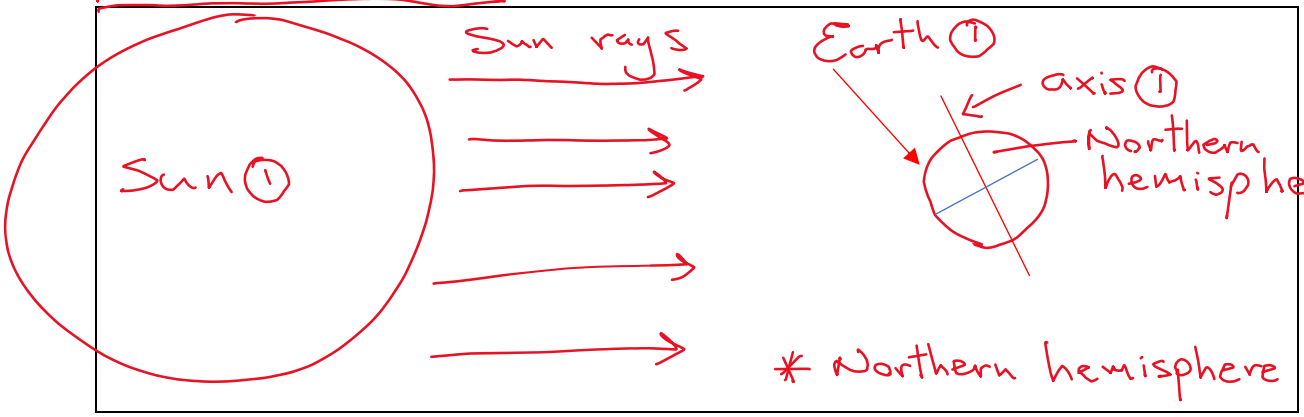
How long does it take for the Earth to orbit the Sun once?

1 year or 365·25 days (1) (1)

How long does it take for the Earth to rotate on its axis once?

1 day or 24 hours (1) (1)

Draw a labelled diagram to show summer in the northern hemisphere of Earth. Include the Sun, Earth, and the Earth's axis. (3)



* Northern hemisphere must be tilted towards the Sun (summer)

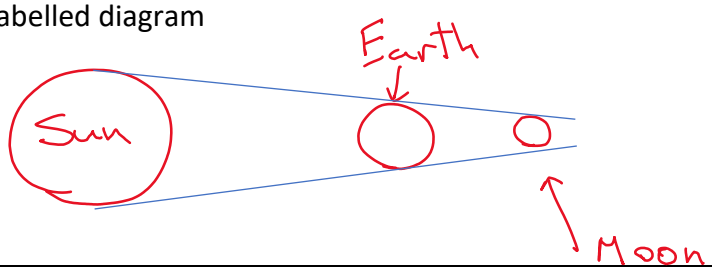
Question 2

Solar eclipses can happen a few times each year.

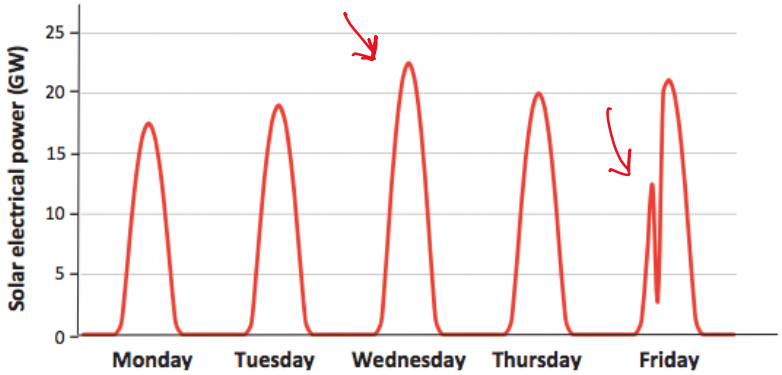
(a) The diagram below shows a simple model of a solar eclipse (an eclipse of the Sun). In the diagram, write the letter **E** for Earth, **M** for Moon and **S** for Sun. (3)

(b) Two weeks before or after a solar eclipse sometimes there is a lunar eclipse (an eclipse of the Moon). Draw a labelled diagram to show a model of a lunar eclipse. (3)

Labelled diagram



A solar eclipse in March 2015 affected the solar electrical power produced in the German electricity grid.
The graph below shows the solar electrical power produced from Monday to Friday during the week of the solar eclipse.



(c) On which day of the week did the solar eclipse occur? Justify your answer

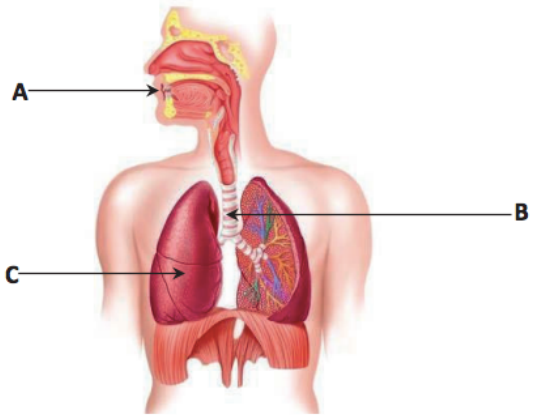
Friday, sharp dip in solar electrical power during the day (1) 1

(d) Which was the brightest day of the week? Justify your answer.

Wednesday. because the most solar electrical power was generated (1) 1

Question 3

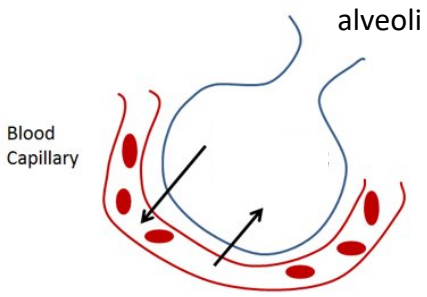
The diagram shows the human respiratory system.



(a) Complete the table below by matching the words to the letters in the diagram. (3)

Lung **Trachea** **Liver** **Oesophagus** **Mouth**

Letter	**Part of respiratory system**
A	mouth 1
B	trachea 1
C	lung 1



During gas exchange in an alveoli, what gas leaves the alveoli and enters the blood?

Oxygen ① (1)

What gas leaves the capillary and enters the alveoli?

Carbon dioxide ① (1)

During digestion large food pieces are broken down so that nutrients can enter the cell.

Name one nutrient from food that the cells must have for respiration.

glucose ① (1)

In what part of the cell does respiration happen?

mitochondria ① (1)

Question 4

Find the weight of a 50 kg person on Venus. The acceleration due to gravity on Venus is 9 m/s^2. Include the unit in your answer. (2)

$F = ma$ (formula & tables book pg 50)

$= (50kg)(9\ m/s^2)$

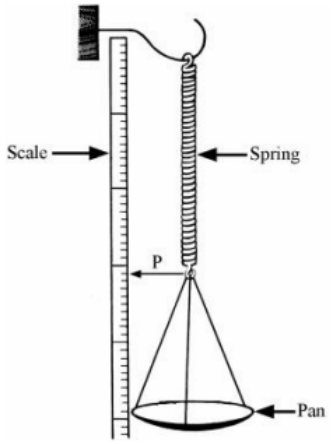
$= 450$ Newtons

Answer ①

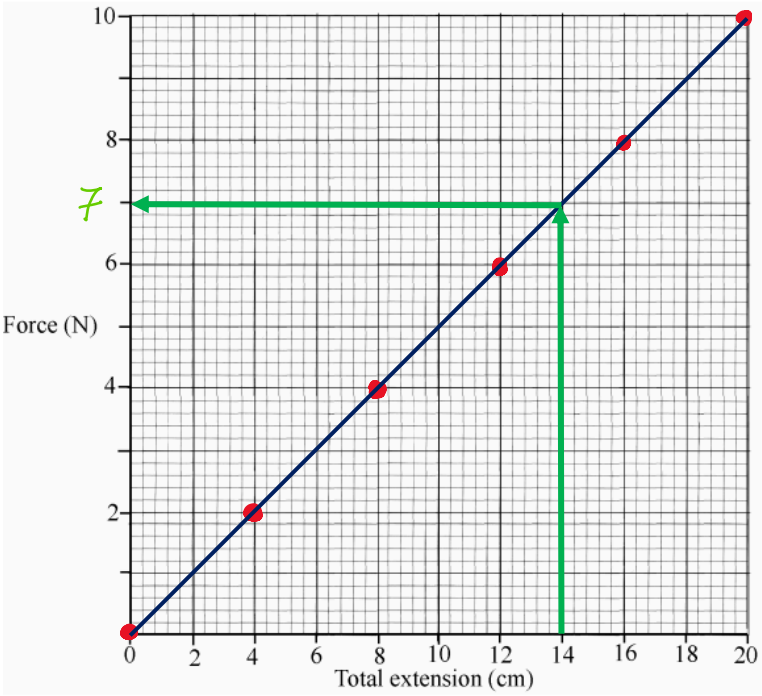
Unit ①

Answer and unit 450N

A pupil used the apparatus shown in the diagram to investigate the relationship between the force applied and the extension produced in the spring by that force. Pointer, P, was used to read the scale. Weights were added to the pan to apply forces to the spring. The data recorded is in the table.



Draw a graph of force against total extension in the grid (4)



Force (N)	Total extension (cm)
0	0
2	4
4	8
6	12
8	16
10	20

What conclusion can be drawn from the graph regarding the relationship between the force applied to the spring and the extension produced by it?

As the force is increased the total extention increases (1)
So force is directly proportional to total extention (1)

Use the graph to determine the weight of a stone that produced an extension of 14 cm in the spring.

7 N (1)

_____(1)

Name the instrument shown on the right that can be used to measure force.

Newton meter (1)

_____(1)

Question 5

A car has many forces acting on it. We can think of the forces as:
1. a driving force caused by the engine.
2. A counter force caused by air resistance and friction.

Tick the box which best describe the statement given.

a) The speed of the car is **increasing quickly**. Which of the following best describes the size of these two forces, while the car is speeding up? (2)

The driving force is **a lot bigger** than the counter force.  ☑ 2

The driving force is **exactly the same size** as the counter force.  ☐

The driving force is **a little bit bigger** than the counter force.  ☐

The driving force is **smaller than** the counter force.  ☐

b) A car is travelling along a level road at a steady speed. Which of the following best describes the size of these two forces? (2)

The driving force is **a lot bigger** than the counter force.  ☐

The driving force is **exactly the same size** as the counter force.  ☑ 2

The driving force is **a little bit bigger** than the counter force.  ☐

The driving force is **smaller than** the counter force.  ☐

c) The car is slowing down.
Which of the following best describes the size of these two forces? (2)

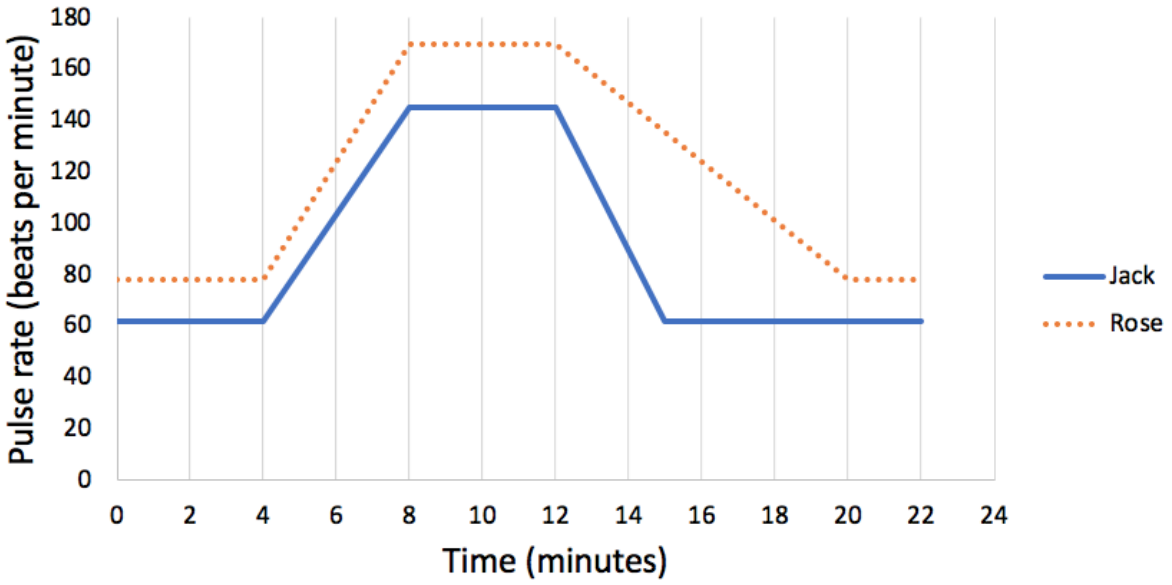
The driving force is **a lot bigger** than the counter force.  ☐

The driving force is **exactly the same size** as the counter force.  ☐

The driving force is **a little bit bigger** than the counter force.  ☐

The driving force is **smaller than** the counter force.  ☑ 2

Question 6



(a) At what time did these two people start exercising? 4 minutes ① (1)

(b) Which person has the greatest pulse rate during exercise? Rose ① (1)

(c) At what time did they stop exercising? 12 minutes ① (1)

(d) Whose pulse rate took the longest to return to normal? Rose ① (1)

(e) Name one lifestyle choice that could have a negative effect on your circulatory system.

Smoking, Diet high in fat, no exercise etc ①

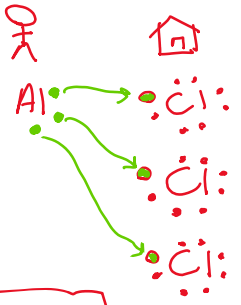
(1)

Question 7 (CW2)

Aluminium reacts with chlorine to form the compound aluminium chloride. This compound often used in deodorant to help reduce sweating by blocking sweat glands. Use the Periodic Table on page 79 of the Formulae and Tables booklet to predict the ratio of aluminium to chlorine in this compound. Hence write the chemical formula for aluminium chloride (4)

Al → group 3

Cl → group 7



Al : Cl

1 : 3

formula

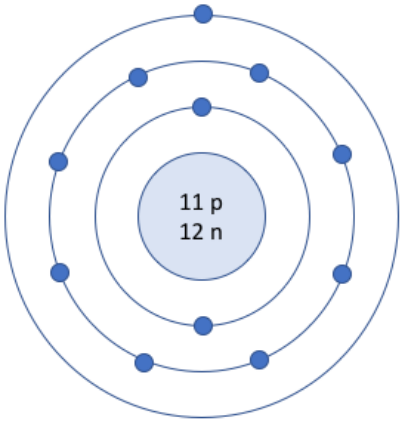
$AlCl_3$

Formula of Aluminum chloride: $AlCl_3$

① mark each for correct group numbers

full marks for correct formula

The image below shows the Bohr model of an atom.



Key
p = protons
n = neutrons

(a) State the atomic number of the atom 11 (1) (1)

(b) State the mass number of the atom 11 + 12 = 23 (1) (1)

(c) What do the dots on the circles represent? electrons (1) (1)

(e) Using the periodic table (on the front cover of this test), identify the element (by name or symbol) that is made up of this type of atom. Justify your answer.

Element: Sodium (Na) (1) (1)

Reason: Because the atomic number of sodium is 11 (1)

(1)

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

Electron **Neutron** **Proton** (3)

Description	**Particle**
Positively charged	Proton (1)
Negatively charged	Electron (1)
No charge	Neutron (1)

Which two sub-atomic particles have the same mass? (1)

1. Protons 2. Neutrons (1)

Which sub-atomic particle has the least mass? Electrons (1) (1)