



Junior Cycle Final Examination

Sample Paper C Solutions

# Science

Common Level

Time: 2 hours

360 marks

Examination number

Centre Stamp

**Section A****150 marks****Question 1****15 marks**

(a)

Description	Characteristic
The ability to react to changes in the environment	Sensitivity
The ability to adjust position	Movement
The increase in size of an organism	Growth
The release of waste products of chemical reactions in cells	Excretion
The intake of food	Nutrition
The release of energy from food in cells	Respiration
The ability to produce offspring	Reproduction

- (b) A living thing needs to be able to move to get food. Energy provided by food allows movement.
- (c) The products of respiration (carbon dioxide and water) are excreted as waste from the body through the lungs, urinary system and skin.

**Question 2****15 marks**

(a)

	Chemical change or physical change
Liquid water changing to ice	Physical
Cutting wood	Physical
A candle burning	Chemical
A candle melting	Physical
Diluting fruit juice	Physical
An iron nail rusting	Chemical
Milk going sour	Chemical

- (b) A new substance has formed.
- (c) An endothermic reaction takes in energy from the surroundings. There is a decrease in temperature, e.g. an instant cold pack. An exothermic reaction releases energy to the surroundings. There is an increase in the temperature, e.g. coal burning.

**Question 3****15 marks****(a)**

Item to be measured	Suitable piece of equipment
The length of your school journal	Ruler
How long it takes to do a lap of the downstairs corridor	Stop clock
The mass of your pencil case	Mass/electronic balance
The volume of water in a bottle	Graduated cylinder
The temperature of water coming out of a tap	Thermometer
The distance from the reception desk to the P.E. hall	Trundle wheel

**(b)** The length of the journal is a much smaller quantity than the distance from the reception desk to the P.E. hall. Using a ruler to measure the distance to the P.E. hall would give inaccurate results as it would have a large margin of error.

**(c)** Kilogram (kg)

**Question 4****15 marks**

The missing terms appear in the following order:

- Concentration
- Collisions
- Temperature
- Activation energy
- Catalyst

**Question 5****15 marks**

**(a)** Student A, because the line for student A on the graph is below student B.

**(b)** Student B, because the slope is steeper at the beginning.

**(c)** Student A, because the line for student A on the graph is below student B.

**(d)** Student A is fitter for the following reasons: they have a lower resting breathing rate; they have a lower breathing rate during and after exercise; their heart rate returned to the resting rate quicker.

**Question 6****15 marks**

**(a)** Mercury or Venus

**(b)** There is daytime and night-time on Mars as Mars rotates on its own axis. If the planet rotates towards the Sun's light, it is daytime. If the planet rotates away from the Sun's light, it is night-time.

**(c)** There are summers and winters on Mars because, like Earth, its axis is tilted away from the Sun. Mars orbits closest to the Sun when its southern hemisphere is tilted towards it, while the northern hemisphere is tilted towards the Sun when it is furthest away. The southern summer is much hotter than the northern summer.

**Question 7****15 marks**

(a)  $\frac{135}{7} = 19.29 \text{ g/cm}^3$

(b)  $\frac{7.2}{30} = 0.24 \text{ g/cm}^3$

(c)

Object	Float or sink
Gold ring	Sink
Cork	Float

(d) The reason the gold ring will sink is because its density is greater than  $1 \text{ g/cm}^3$ . The cork will float as it has a density of less than  $1 \text{ g/cm}^3$ .

**Question 8****15 marks**

(a) Using ten quadrats will give a good random sample of the habitat and will give more accurate results.

(b) Grass

(c)  $\frac{4}{10} \times \frac{100}{1} = 40\%$

(d)  $\frac{3}{10} \times \frac{100}{1} = 30\%$

**Question 9****15 marks**

(a) Ammeter

(b) Voltmeter

(c) 0.1 A

(d) It suggests that they combine:  $0.2 + 0.2 = 0.4$  amps.

(e) The lamps in the parallel circuit are brighter because more current is flowing through them: 0.2 amps versus 0.1 amps in the series circuit.

**Question 10****15 marks**

(a) A period of cold, windless weather caused the airborne pollutants from burning coal to form a thick layer of smog over the city.

(b) Any two of the following:

- Pneumonia
- Tuberculosis
- Bronchitis
- Heart failure

(c) Reduce the use of fossil fuels.

Use renewable sources of energy like solar and wind energy.

Walk or cycle instead of using a car.

## Question 11

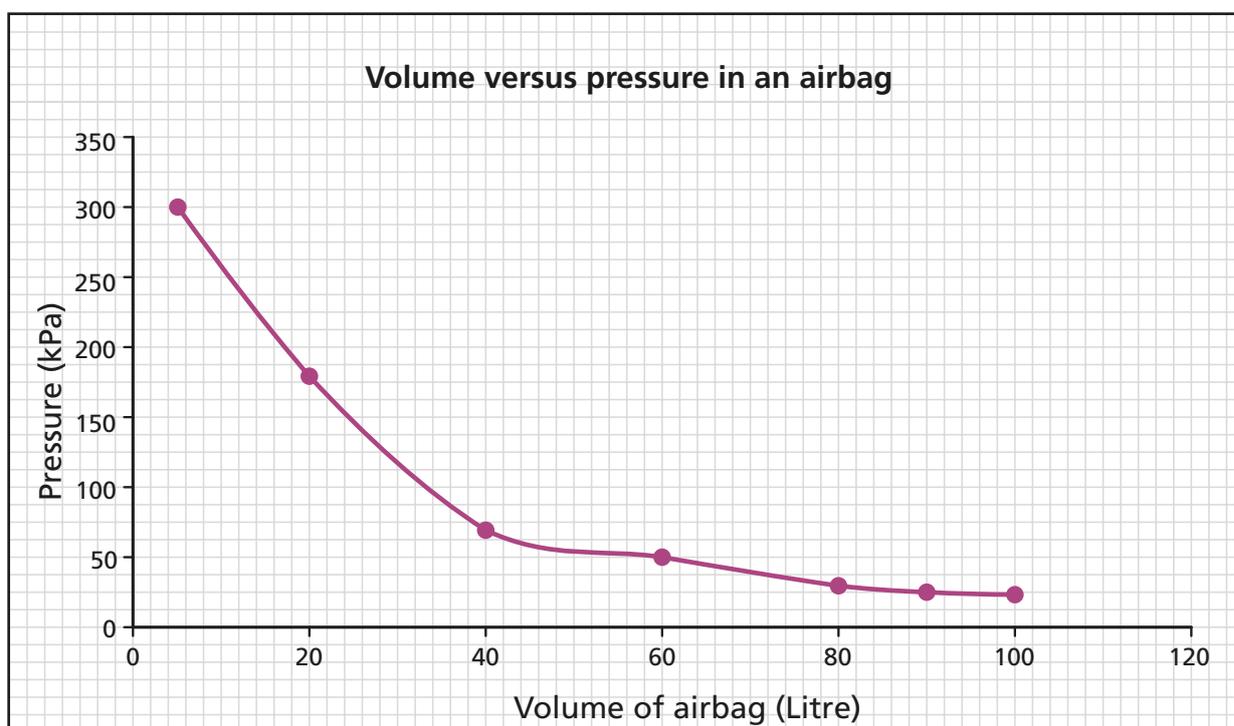
30 marks

- (a) A balanced diet is one that gives your body the correct amount of each nutrient it needs to function correctly.
- (b) Carbohydrate (sugar)
- (c) Sugar is a fuel for the body and provides energy.
- (d) Consuming too many fizzy drinks can increase the risk of heart disease and the development of diabetes.
- (e) Reference intakes provide information about the number of calories and amount of energy, fat, sugars and salt needed for a healthy diet. Reference intakes help people make informed choices about what they are consuming.
- (f) Sugar: it provides energy and this will keep the consumer awake.

## Question 12

30 marks

- (a) It is a compound. Sodium and nitrogen are bonded together chemically.
- (b) The force it would exert could cause injury to the person in the car.
- (c) The force it would exert would not be enough to protect the person from injury.
- (d)



- (e) As the volume of the airbag increases, the pressure decreases.
- (f) A benefit is that it will protect the occupants of the car from major injury during a collision. A risk is that the pressure exerted must be correct in order to prevent further injury, and to ensure it is fit for purpose.

**Question 13**

**30 marks**

- (a) Any of the following:
- Size of the object
  - The angle of impact
  - The mass of the object
- (b) The height from which the object is dropped
- (c) The size of the crater formed
- (d) Any two of the following:
- The object being dropped (the metal ball)
  - The same equipment
  - The same method for measuring the size of the crater
  - The same substance onto which the metal ball is dropped
- (e) The following is a suggested method for this investigation:
- Fill a container with flour.
  - Clamp a metre stick using a retort stand.
  - Hold the metal ball 60 cm above the flour.
  - Drop the metal ball onto the flour.
  - Measure the depth of the crater formed using a ruler.
  - Flatten out the flour and repeat three times to get the average.
  - Repeat for different heights.
  - Graph results.

(f)

Height dropped (cm)	Average depth of crater (cm)
10	1.6
20	1.9
30	2.6
40	3.1
50	3.6
60	3.9

- (g) The data set for 30 cm should be repeated as the results are not within 0.2 cm of each other and the others are. There is a much greater variation in these results than in the other data sets.
- (h) The greater the height from which the metal ball is dropped, the greater the depth of crater that is formed.

**Question 14**

**30 marks**

- (a) Any three of the following:
- The cost of the mission
  - The physical health of the astronauts
  - The mental health of the astronauts
  - The length of the journey
- (b) The headlines. The first article states that humans are going to Mars. The second article claims that humans will not be able to survive on Mars.

- (c) No. They do not provide data and do not reference the studies that have been carried out. They make claims but are not backing them with scientific evidence.
- (d) No. There are too many obstacles to overcome. The journey to Mars is difficult in itself and even if humans get there, it is unknown if they will be able to survive there.
- (e) Any two of the following:
  - Helps develop our understanding of our place in the universe
  - Improves understanding of the human body
  - Improves technologies
  - Helps monitor climate change on Earth
  - Helps in making scientific discoveries
  - Helps measure pollution

### Question 15

45 marks

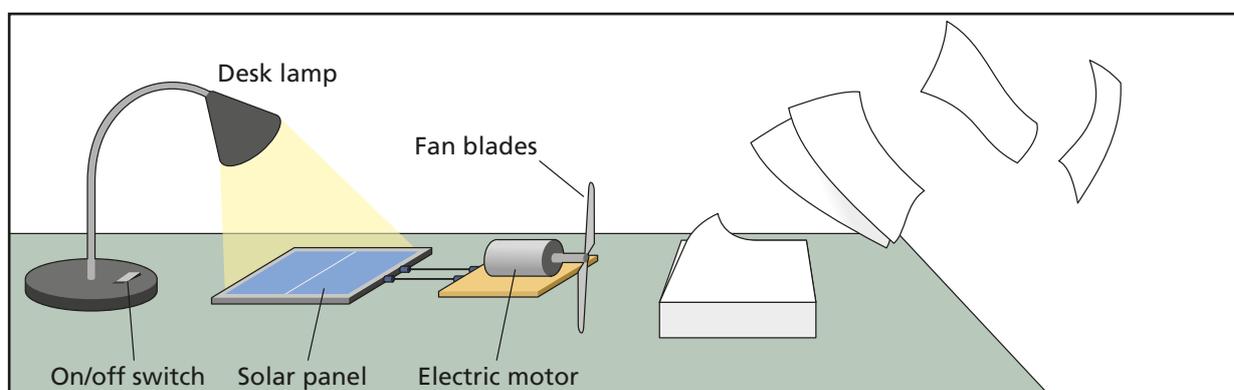
- (a) Scientists design an experiment so that they can observe or measure if changes to one thing cause something else to vary in a repeatable way. If other variables in an investigation are not fixed, it is difficult to determine which variable is causing the change.
- (b) D. The smallest volume of carbon dioxide was produced.
- (c) C. The slope of this graph is steepest at the beginning.
- (d) The size of the tablet
- (e) The finely crushed tablet has a greater surface area. This will allow the tablet to dissolve much quicker.
- (f) The higher the temperature of the water, the quicker the tablet dissolves.
- (g) It would have been difficult to measure the temperature exactly as the water would cool once the heat is removed.

### Question 16

45 marks

- (a) Heat energy
- (b) The combined heat and power station is more efficient as over half of the energy output is useful energy. In the coal-burning station over half of the energy output is waste energy.
- (c) Electrical energy transforms to solar energy that, in turn, transforms to kinetic energy.
- (d) Energy cannot be created or destroyed. It can only be transformed from one form to another.
- (e) The greater the light intensity, the greater the intensity at which the fan will operate.

(f)



- (g) Quantitative data
- (h) The greater the light intensity, the greater the intensity at which the fan will operate.