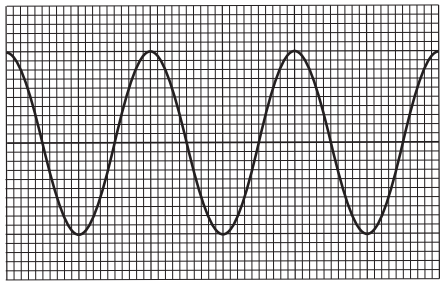
Question	Answer	Marks	Further Information
1(a)	root <u>hair</u> (cell)	**1**	**Note** root on its own is not sufficient
1(b)	absorption	**1**	**Accept** osmosis **or** diffusion
1(c)	xylem	**1**	
1(d)	transpiration	**1**	**Accept** evaporation **or** diffusion

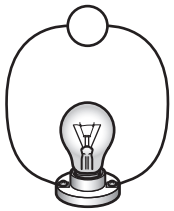
Question	Answer	Marks	Further Information
2(a)(i)	covalent	**1**	
2(a)(ii)	loses	**1**	**Accept** gives away
2(b)	attraction/bond between a positively charged ion and a negatively charged ion	**1**	**Accept** electrostatic attraction between ions

Question	Answer	Marks	Further Information
3	 sound waveform **B**	**1**	**Note** drawn waveform must have the same amplitude and frequency by eye but all the peaks and troughs are opposite each other as a mirror image of waveform **A**

Question	Answer	Marks	Further Information
4(a)	less rain	**1**	more than **one** answer circled = 0 marks **Accept** any indication of the correct answer, e.g. ticking or underlining, but circling takes precedence
4(b)	**any two from** less food less water to drink lack of hygiene **or** increase risk of diseases migration of people (to find food **or** to find jobs) (idea of) loss of plant species **or** loss of animal species	**2**	each correct answer = 1 mark **Accept** increase in diseases such as cholera or typhoid **Accept** other suitable impacts of desertification, e.g. lack to trees to build houses

Question	Answer	Marks	Further Information
5(a)	carbon dioxide water oxygen	**3**	each correct answer = 1 mark **Note** carbon dioxide and water can be written in any order
5(b)	photosynthesis chloroplasts	**2**	each correct answer = 1 mark

Question	Answer	Marks	Further Information
6(a)	$Zn + CuSO_4 \longrightarrow ZnSO_4 + Cu$	**1**	**Accept** = for $\longrightarrow$ **Accept** reactants in either order **Accept** products in either order **Ignore** words
6(b)	no (no mark) (idea that) copper is less reactive than magnesium **ora**	**1**	yes ticked = 0 marks for the question **Accept** copper is below magnesium in the reactivity series **ora** **Note** copper is less reactive is **not** sufficient **Do not accept** copper is less reactive than magnesium sulfate
6(c)	yes (no mark) (idea that) iron is more reactive than silver **ora**	**1**	no ticked = 0 marks for the question **Accept** iron is above silver in the reactivity series **ora** **Note** iron is more reactive is **not** sufficient **Do not accept** iron is more reactive than silver nitrate

Question	Answer	Marks	Further Information
7(a)(i)	voltmeter	**1**	**Do not accept** voltameter **or** voltage meter
7(b)(ii)	meter drawn across the lamp, e.g.  lamp	**1**	**Note** any symbol may be used for the meter, e.g. just a circle or a picture of a meter
7(b)	(resistance =) $\frac{\text{voltage}}{\text{current}}$ **or** $\frac{1.5}{0.6}$ 2.5 (Ω)	**2**	**Accept** correct answer with or without working = 2 marks correct equation **or** substitution = 1 mark correct calculation = 1 mark **Note** answer on answer line takes precedence

Question	Answer	Marks	Further Information
8(a)	(idea that) to remove the threat of the asteroid hitting the Earth	**1**	**Accept** (idea that) NASA want to practice destroying asteroids
8(b)	**any one from** (idea of) mass extinction (idea of) shock waves (idea of) destruction of buildings **or** destruction of cities (idea of) dust clouds that block out light **or** dust blocks the Sun (idea of) increase in temperature where the asteroid hits	**1**	 **Accept** many people would die **Ignore** just kills animals **or** kills humans **Accept** flattens buildings

Question	Answer	Marks	Further Information
9	(A) endive (B) purslane (C) mizuna (D) oak leaf (E) romaine	**2**	**all five** correct = 2 marks **two, three** or **four** correct = 1 mark **one** correct = 0 marks

Question	Answer	Marks	Further Information
10(a)	(density =) mass ÷ volume **or** 150 ÷ 25 (density =) 6 g/cm^3	**3**	**Accept** 6 g/cm^3 with or without working = 3 marks **Accept** 6 with or without working = 2 marks equation **or** correct substitution = 1 mark **Accept** d = m/v **or** m ÷ v correct units = 1 mark **Note** density and units on answer line takes precedence
10(b)	giant	**1**	**Ignore** metallic **or** ionic **or** molecular **or** covalent

Question	Answer	Marks	Further Information
11(a)	thermal energy is transferred from block **A** to block **B**	**1**	**Accept** thermal energy is dissipated **Accept** heat for thermal energy
11(b)	(idea that) the two blocks become the same temperature	**1**	**Accept** the block **A** gets cooler and the block **B** get hotter **Accept** they both contain the same amount of thermal energy **Accept** heat for thermal energy **Ignore** thermal energy transfer stops

Question	Answer	Marks	Further Information
12	(heading) time in min(utes) (heading) volume in cm^3 data correctly entered without units	**3**	each correct answer = 1 mark **Accept** time **and** volume in the headings without units = 1 mark **Accept** min(utes) **and** cm^3 in the headings without physical quantity= 1 mark **Ignore** order of the data

Question	Answer	Marks	Further Information
13	**any two from** liquid water becomes a gas **or** water becomes water vapour (idea that) thermal energy is transferred from the skin (to the water) to the air (evaporation) is endothermic **or** requires thermal energy	**2**	each correct answer = 1 mark **Accept** faster particles leave the liquid **or** particles with more energy escape the water **Accept** slower particles left behind with liquid water **or** particles with less energy left in the liquid water

Question	Answer	Marks	Further Information
14(a)	**any one from** (idea that) emissions are too low to show on the graph (idea that) the emissions were not measured (idea that) fossil fuels were not used then (idea that) the population was much lower in 1850 to 1865 (idea that) the only carbon dioxide released is in the slow carbon cycle	**1**	**Ignore** just no carbon dioxide is released
14(b)	(description of trend) a slow increase **and** then a rapid increase (explanation) (idea that) slow increase linked to just the slow carbon cycle **and** rapid increase linked to the (slow and) fast carbon cycle	**2**	each correct answer = 1 mark **Accept** increases
14(c)	any value between 7 and 10.5 (billions of tonnes)	**1**	

Question	Answer	Marks	Further Information
15(a)	(measurement) decrease in volume of red dye solution **or** decrease in mass of red dye solution **or** distance travelled by red dye solution **and** (equipment) measuring cylinder **or** a balance **or** ruler (measurement) time for red dye solution to reach leaf **and** (equipment) stop-watch	**2**	each measurement and linked equipment = 1 mark **Accept** water for red dye solution **Accep**t scales **Ignore** weighing **or** top pan **or** lever arm **or** electronic **Accept** stop-clock
15(b)	more reliable **or** to identify anomalous results **or** to see if results can be reproduced	**1**	**Do not accept** for accuracy **or** fair testing

Question	Answer	Marks	Further Information
16(a)	(risk) hot water may scald **and** (control) wear heatproof gloves (risk) dye may be poisonous **or** dye may be harmful **or** dye may stain **or** dye may splash into eyes **and** (control) wear eye protection **or** wear goggles **or** wear gloves	**2**	each risk correctly linked to a control = 1 mark **Accept** hot water may cause burns **Note** mark answers wherever seen
16(b)	(predictions) (idea that) cold blue water sinks **and** hot red water floats (explanation for cold blue water) cold water is more dense than the water at room temperature (explanation for hot red water) hot water is less dense than the water at room temperature	**3**	each correct answer = 1 mark