**IYG Term 2 – Foundation**

**Q1.**

Living organisms are made of cells.

(a)     Animal and plant cells have several parts. Each part has a different function.

Draw **one** line from each cell part to the correct function of that part.



**(3)**

(b)     The diagram below shows a cell from a plant leaf.



Which **two** parts in the diagram above are **not** found in an animal cell?

**(2)**

**(Total 5 marks)**

**Q2.**

Gas exchange takes place in the lungs.

The diagram shows an alveolus next to a blood capillary in a lung.

The arrows show the movement of two gases, **A** and **B**.



(a)     (i)      Draw a ring around the correct answer to complete the sentence.

|  |  |
| --- | --- |
| Gases **A** and **B** move by | diffusion.osmosis.respiration. |

**(1)**

(ii)     Gas **A** moves from the blood to the air in the lungs.

Gas **A** is then breathed out.

Name Gas **A**.

**(1)**

(iii)    Which cells in the blood carry Gas **B**?

Draw a ring around the correct answer.

**platelets**                **red blood cells**                **white blood cells**

**(1)**

(b)     The average number of alveoli in each human lung is 280 million.

The average surface area of 1 million alveoli is 0.25 m2.

Calculate the total surface area of a human lung.

**(2)**

(c)     An athlete trains to run a marathon. The surface area of each of the athlete’s lungs has increased to 80 m2.

Give **one** way in which this increase will help the athlete.

**(1)**

**(Total 6 marks)**

**Q3.**

The structures of four substances, **A**, **B**, **C** and **D**, are represented in **Figure 1**.



(a)     Use the correct letter, **A**, **B**, **C** or **D**, to answer each question.

|  |  |  |
| --- | --- | --- |
| (i) | Which substance is a gas? |  |

**(1)**

|  |  |  |
| --- | --- | --- |
| (ii) | Which substance is a liquid? |  |

**(1)**

|  |  |  |
| --- | --- | --- |
| (iii) | Which substance is an element? |  |

**(1)**

|  |  |  |
| --- | --- | --- |
| (iv) | Which substance is made of ions? |  |

**(1)**

(b)     **Figure 2** shows the bonding in substance **C**.



(i)      What is the formula of substance **C**?

Draw a ring around the correct answer.

|  |  |  |
| --- | --- | --- |
| **SO2** | **SO2** | **S2O** |

**(1)**

(ii)     Use the correct answer from the box to complete the sentence.

|  |  |  |
| --- | --- | --- |
| **delocalised** | **shared** | **transferred** |

When a sulfur atom and an oxygen atom bond to produce substance **C**,

electrons are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(1)**

(iii)    What is the type of bonding in substance **C**?

Draw a ring around the correct answer.

|  |  |  |
| --- | --- | --- |
| **covalent** | **ionic** | **metallic** |

**(1)**

**(Total 7 marks)**

**Q4.**

  The diagrams show the electronic structure of four different atoms.



Use the Chemistry Data Sheet to help you to answer these questions.

(a)      Name the two sub-atomic particles in the nucleus of an atom.

**(1)**

(b)     Why is there no overall electrical charge on each atom?

**(1)**

(c)     Why is **Atom A** unreactive?

**(1)**

(d)     Which **two** of these atoms have similar chemical properties?
Give a reason for your answer.

**(2)**

**(Total 5 marks)**

**Q5.**

A ‘can-chiller’ is used to make a can of drink colder.

**Figure 1** shows a can-chiller.



(a)     The can-chiller decreases the temperature of the liquid in the can by 15 °C.
The mass of liquid is 0.33 kg.
The specific heat capacity of the liquid is 4200 J / kg °C.

Calculate the energy transferred from the liquid as it cools.

**(2)**

(b)     Complete the following sentence.

The specific heat capacity of a substance is the amount of energy required to

change the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of one kilogram of the

substance by one degree Celsius.

**(1)**

(c)     To calculate the specific heat capacity of a material, the mass of the material needs to be measured.

State the name of a measuring instrument used to measure mass.

**(1)**

(d)     The back of the can-chiller has cooling fins, as shown in **Figure 2**.



The cooling fins increase the rate of energy transfer from the can-chiller to the surroundings.

Complete the following sentences.

The cooling fins are a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ colour because that makes them

good emitters of infrared radiation.

The large surface area of the cooling fins allows the air around the can-chiller

to gain energy quickly and rise, transferring energy by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

**(2)**

(e)     (i)      The energy input to the can-chiller is the same as the energy output. This shows that energy is conserved.

Complete the following sentence.

Energy can be transferred usefully, stored or dissipated, but cannot be

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or destroyed.

**(1)**

(ii)     The temperature of the can of drink decreases while it is in the can-chiller.

What happens to the temperature of the air around the cooling fins?

**(1)**

**(Total 8 marks)**

**Q6.**

(a)     The circuit diagram drawn below includes a component labelled **X**.



(i)      Calculate the potential difference across the 8 ohm resistor.

Show clearly how you work out your answer.

**(2)**

(ii)     What is the potential difference across component **X**?

**(1)**

(b)     The graph shows how the resistance of component **X** changes with temperature.



(i)      What is component **X**?

**(1)**

(ii)     Over which range of temperatures does the resistance of component **X** change the most?

Put a tick () next to your choice.

|  |  |
| --- | --- |
| 0 °C to 20 °C |  |
| 20 °C to 40 °C |  |
| 40 °C to 60 °C |  |
| 60 °C to 80 °C |  |
| 80 °C to 100 °C |  |

**(1)**

**(Total 5 marks)**