**Term 2 IYG – Higher**

Mark schemes

**Q1.**

(a)     (i)      diffusion

**1**

(ii)     carbon dioxide

*accept CO2 / CO2*

*do* ***not*** *accept CO2*

**1**

(iii)    red blood cells

**1**

(b)     70

*if no / incorrect answer then*

*70 000 000*

***or***

*280 x 0.25 gains* ***1*** *mark*

*ignore doubling the answer*

**2**

(c)     allows more gas / oxygen / CO2(exchange)

*do* ***not*** *accept air*

**1**

**[6]**

**Q2.**

(a)    **B**

*no mark for “B” alone, the mark is for B* ***and*** *the explanation.*

large(r) surface / area **or** large(r) membrane

*accept reference to microvilli*

*ignore villi / hairs / cilia*

*accept reasonable descriptions of the surface eg folded membrane / surface*

*do* ***not*** *accept wall / cell wall*

**1**

(b)    (i)      any **one** from:

•        (salivary) amylase

•        carbohydrase

**1**

(ii)     many ribosomes

*do* ***not*** *mix routes. If both routes given award marks for the greater.*

**1**

ribosomes produce protein

*accept amylase / enzyme / carbohydrase is made of protein*

**or**

(allow)

many mitochondria      (1)

mitochondria provide energy to build / make protein      (1)

*accept ATP instead of energy*

**1**

**[4]**

**Q3.**

(a)     protons **(and)** neutrons

*both needed for* ***1*** *mark*

*ignore p / + and n / 0*

*do* ***not*** *accept electrons*

**1**

(b)     because the number of protons is equal to the number of electrons

*allow protons and electrons balance / cancel out*

*allow positive / + and negative / - balance / cancel out*

**1**

(c)     *it = atom A*

because atom A has a full highest energy level **or** full outer shell

*allow all the shells are full* ***or*** *no incomplete shell*

**or** because atom A has a stable arrangement of electrons

*allow because atom A is in Group 0 / a noble gas*

**1**

(d)     (atom) B / lithium / Li **(and)**

(atom) C / sodium / Na

*both needed for* ***1*** *mark*

**1**

because they have the same number/one outer electron(s)

*linked to answer for first mark*

*accept because both need to lose one / an electron*

*allow because (atoms) B and C are in Group 1 / the same group / are alkali metals*

**1**

**[5]**

**Q4.**

(a)     (i)      **Quality of Written Communication***The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme.*

*maximum 2 marks if ideas not expressed well*

         layers / lattice / giant structure / regular pattern of atoms (diagram)

*allow layers / lattice / giant structure / regular pattern of ions*

*do* ***not*** *accept particles*

**1**

         outer (shell) electrons

*accept valence electrons*

**1**

         (free to) move (through whole structure)

*accept delocalised / mobile / free*

**1**

(ii)     the free electrons (allow the metal to conduct electricity)

*accept electrons move / mobile / delocalised*

**1**

(iii)     atoms / ions / layers can slide / slip / move over each other

**1**

(b)     (i)      copper oxide formed **or** Cu reacts with oxygen **or** Cu is oxidised

**1**

this is a poor conductor **or** gets in the way of free moving electrons **or** fewer mobile electrons

*do* ***not*** *accept electricity*

**1**

**or**

         oxygen atoms / oxygen molecules / oxide ions in metal

*do not accept oxygen pockets / bubbles*

         prevents / disrupts flow of electrons /  
current or fewer mobile electrons (1)

*do* ***not*** *accept macro explanations  
do* ***not*** *accept electricity*

(ii)     hydrogen reacts with oxygen or water is formed **or** hydrogen reduces  
copper oxide etc.

**1**

**[8]**

**Q5.**

(a)     (i)      4 (V)

*allow* ***1*** *mark for correct substitution*

**2**

(ii)     5 (V) or (9 – their (a)(i)) correctly calculated

*e.c.f*

*do* ***not*** *allow a negative answer*

**1**

(b)     (i)      thermistor

*c.a.o*

**1**

(ii)     0°C to 20°C

**1**

**[5]**

**Q6.**

(a)      conduction

**1**

(b)     (i)       there is a bigger temperature difference between the water and the surrounding air

*accept the water is hottest / hotter*

**1**

so the transfer of energy (from hot water) is faster

*accept heat for energy*

*ignore temperature falls the fastest*

**1**

(ii)     120

*allow* ***1*** *mark for converting kJ to J correctly, ie 4 032 000*

**or**

correctly calculating temperature fall as 8°C

**or**

allow **2** marks for correct substitution, ie 4 032 000 = m × 4200 × 8

answers of 0.12, 19.2 **or** 16.6 gain **2** marks

answers of 0.019 **or** 0.017 gain **1** mark

**3**

(iii)     water stays hot for longer

**1**

so heater is on for less time

*accept so less energy needed to heat water*

**1**

so cost of the jacket is soon recovered from) lower energy costs / bills

*accept short payback time*

**1**

**[9]**