



Chem!stry

Name: ()

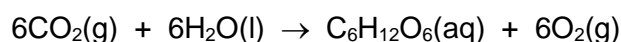
Class:

Date: / /

Secondary One Science – Interdisciplinary Question – Example

This question concerns the process of photosynthesis. Photosynthesis is a process that takes place in green plants, converting carbon dioxide and water into glucose and oxygen in the presence of sunlight. Photosynthesis involves a complex series of reactions, but in simple terms it can be represented by the balanced chemical equation given below.

carbon dioxide + water → glucose + oxygen



1. Photosynthesis is a **system** in which **change** takes place.

(a) Give one generalisation about a **system**. [1]

.....
.....

(b) In addition to science, give a specific example of **change** that you have studied in another discipline. [1]

.....
.....

2. Glucose is a reducing sugar.

(a) Name the three chemical elements present in glucose. [1]

.....

(b) Briefly describe the test for a reducing sugar. [1]

.....
.....

3. Refer to the balanced chemical equation for photosynthesis.

(a) Name all of the compounds. [1]

.....

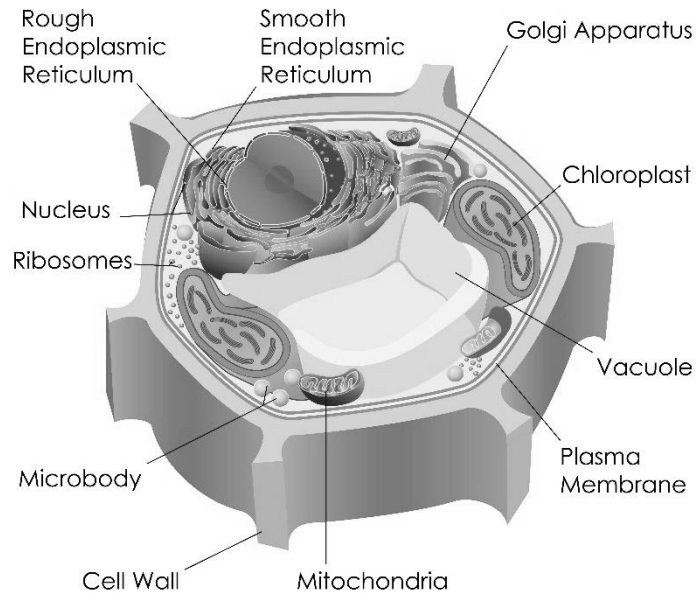
(b) Name one chemical that is diatomic. [1]

.....

4. Glucose is a monosaccharide. Other monosaccharides include fructose, galactose and ribose. Monosaccharides are white crystalline solids that decompose on heating and are soluble in water. Name a method by which a scientist could separate a mixture of fructose, galactose, glucose and ribose. [1]

.....

5. The diagram below shows a plant cell.



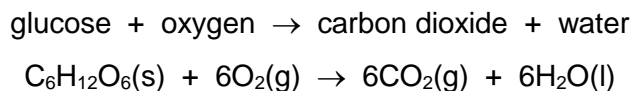
- (a) Name the organelle which photosynthesis takes place. [1]

.....

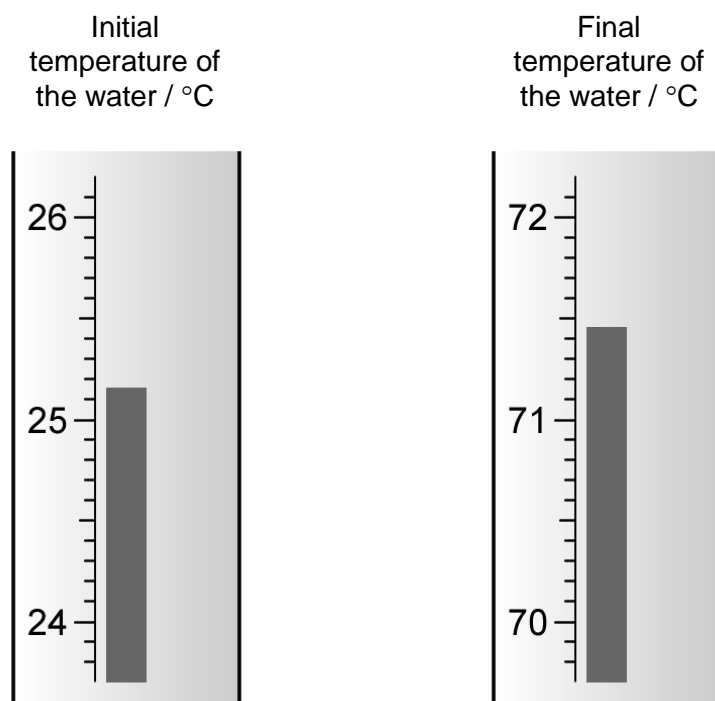
- (b) Name the organelle in which aerobic respiration takes place. [1]

.....

6. Glucose can be used as a fuel. When glucose burns, it reacts with oxygen to produce carbon dioxide and water. This reaction releases energy in the form of heat and light.



A student performed an experiment to determine how much energy is released when 5.00 g of glucose is completely burned in air. She ignited the glucose and used the heat energy from the flame to increase the temperature of 150 cm³ of water in a glass beaker. Diagrams of the thermometer showing the initial temperature of the water (before the burning the glucose) and the final temperature of the water (immediately after all of the glucose had been burned) are given below.



- (a) Instead of using a glass beaker, suggest another container that the student could have used that would have ensured better heat transfer from the flame to the water. [1]

.....
.....

- (b) To what degree of precision can the thermometer that the student used be read? [1]

.....

- (c) By how much did the beaker of water increase in temperature? Show your working [1]

.....

[Total = 12 marks]

- Scan the QR code below for the answers to this assignment.



http://www.nygh.sg/miscellaneous/sec_1_chem/interdisciplinary_ans.pdf

Periodic Table

The Periodic Table of the Elements

Group		I	II	III	IV	V	VI	VII	0																																										
		1 H hydrogen 1							4 He helium 2																																										
3	4	7 Li lithium	9 Be beryllium		11 B boron	12 C carbon	13 Al aluminium	14 Si silicon	15 P phosphorus	16 S sulfur	17 Cl chlorine	18 Ar argon	19 K potassium	20 Ca calcium	21 Sc scandium	22 Ti titanium	23 V vanadium	24 Cr chromium	25 Mn manganese	26 Fe iron	27 Co cobalt	28 Ni nickel	29 Cu copper	30 Zn zinc	31 Ga gallium	32 Ge germanium	33 As arsenic	34 Se selenium	35 Br bromine	36 Kr krypton																					
11	12	23 Na sodium	24 Mg magnesium		27 Al aluminium	28 Si silicon	29 K potassium	30 Ca calcium	31 Sc scandium	32 Ti titanium	33 V vanadium	34 Cr chromium	35 Mn manganese	36 Fe iron	37 Co cobalt	38 Ni nickel	39 Cu copper	40 Zn zinc	41 Ga gallium	42 Ge germanium	43 As arsenic	44 Se selenium	45 Br bromine	46 Kr krypton	47 Rb rubidium	48 Sr strontium	49 Y yttrium	50 Zr zirconium	51 Nb niobium	52 Mo molybdenum	53 Tc technetium	54 Ru ruthenium	55 Rh rhodium	56 Pd palladium	57 Ag silver	58 Cd cadmium	59 In indium	60 Sn tin	61 Sb antimony	62 Te tellurium	63 I iodine	64 Xe xenon									
19	20	39 K potassium	40 Ca calcium		45 Sc scandium	46 Ti titanium	47 V vanadium	48 Cr chromium	49 Mn manganese	50 Fe iron	51 Co cobalt	52 Ni nickel	53 Cu copper	54 Zn zinc	55 Ga gallium	56 Ge germanium	57 As arsenic	58 Se selenium	59 Br bromine	60 Kr krypton	61 Rb rubidium	62 Sr strontium	63 Y yttrium	64 Zr zirconium	65 Nb niobium	66 Mo molybdenum	67 Tc technetium	68 Ru ruthenium	69 Rh rhodium	70 Pd palladium	71 Ag silver	72 Cd cadmium	73 In indium	74 Sn tin	75 Sb antimony	76 Te tellurium	77 I iodine	78 Xe xenon													
37	38	85 Rb rubidium	86 Sr strontium		89 Y yttrium	90 Zr zirconium	91 Nb niobium	92 Mo molybdenum	93 Tc technetium	94 Ru ruthenium	95 Rh rhodium	96 Pd palladium	97 Ag silver	98 Cd cadmium	99 In indium	100 Sn tin	101 Sb antimony	102 Te tellurium	103 I iodine	104 Xe xenon	105 Rb rubidium	106 Sr strontium	107 Y yttrium	108 Zr zirconium	109 Nb niobium	110 Mo molybdenum	111 Tc technetium	112 Ru ruthenium	113 Rh rhodium	114 Pd palladium	115 Ag silver	116 Cd cadmium	117 In indium	118 Sn tin	119 Sb antimony	120 Te tellurium	121 I iodine	122 Xe xenon													
55	56	133 Cs caesium	134 Ba barium		137 La lanthanum	138 Ce cerium	139 Pr praseodymium	140 Nd neodymium	141 Pm promethium	142 Sm samarium	143 Eu europium	144 Gd gadolinium	145 Tb terbium	146 Dy dysprosium	147 Ho holmium	148 Er erbium	149 Tm thulium	150 Yb ytterbium	151 Lu lutetium	152 Hf hafnium	153 Ta tantalum	154 W tungsten	155 Re rhenium	156 Os osmium	157 Ir iridium	158 Pt platinum	159 Au gold	160 Hg mercury	161 Tl thallium	162 Pb lead	163 Bi bismuth	164 Po polonium	165 At astatine	166 Rn radon	167 Fr francium	168 Ra radium	169 Ac actinium	170 Th thorium	171 Pa protactinium	172 U uranium	173 Np neptunium	174 Pu plutonium	175 Am americium	176 Cm curium	177 Bk berkelium	178 Cf californium	179 Es einsteinium	180 Fm fermium	181 Md mendelevium	182 No nobelium	183 Lr lawrencium
87	88	87 Fr francium	88 Ra radium		89 La lanthanum	90 Ce cerium	91 Pr praseodymium	92 Nd neodymium	93 Pm promethium	94 Sm samarium	95 Eu europium	96 Gd gadolinium	97 Tb terbium	98 Dy dysprosium	99 Ho holmium	100 Er erbium	101 Tm thulium	102 Yb ytterbium	103 Lu lutetium	104 Hf hafnium	105 Ta tantalum	106 W tungsten	107 Re rhenium	108 Os osmium	109 Ir iridium	110 Pt platinum	111 Au gold	112 Hg mercury	113 Tl thallium	114 Pb lead	115 Bi bismuth	116 Po polonium	117 At astatine	118 Rn radon	119 Fr francium	120 Ra radium	121 Ac actinium	122 Th thorium	123 Pa protactinium	124 U uranium	125 Np neptunium	126 Pu plutonium	127 Am americium	128 Cm curium	129 Bk berkelium	130 Cf californium	131 Es einsteinium	132 Fm fermium	133 Md mendelevium	134 No nobelium	135 Lr lawrencium

*58-71 Lanthanoid series
†90-103 Actinoid series

Key $\begin{matrix} a \\ X \\ b \end{matrix}$
 a = relative atomic mass
 X = atomic symbol
 b = proton (atomic) number