



GCSE

Science B J640

Gateway Science Suite

General Certificate of Secondary Education

## Mark Scheme for the Units

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January 2009

J640/MS/R/09

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# Mark Scheme Guidance

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/ = alternative and acceptable answers for the same marking point

**(1)** = separates marking points

**not** = answers which are not worthy of credit

**reject** = answers which are not worthy of credit

**ignore** = statements which are irrelevant

**allow** = answers that can be accepted

( ) = words which are not essential to gain credit

   = underlined words must be present in answer to score a mark

**ecf** = error carried forward

**AW** = alternative wording

**ora** = or reverse argument

# B621/01 Unit 1: Modules B1, C1 and P1 Foundation Tier

Question		Expected Answers	Marks	Additional Guidance
1	(a)	36.5 to 37.5 (°C) (1)	1	
	(b)	gains heat loses heat respiration sweating (1) shivering exercise (1)	2	lose 1 mark for each incorrect answer
	(c) (i)	cholera (1)	1	if no box ticked allow correct answer clearly indicated.
	(ii)	ingests / destroy / engulfs (bacteria / pathogens) (1) (make / produce) antibodies (1)	2	<b>not</b> kill / eats / swallow / attacks / fights / gets rid of / surrounds incorrect reference to antibodies scores (0) e.g. white blood cells kill antibodies
		<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	correct bars drawn (2)	2	all correct = 2 marks 2 or 3 correct = 1 mark margin of error <b>allow</b> $\pm \frac{1}{2}$ square, but tin of peaches must not be zero <b>ignore</b> width of bars
	(b) (i)	60 (1)	1	no need to show working
	(ii)	amino acids (1)	1	<b>allow</b> peptides <b>not</b> polypeptides  be tolerant of spelling <b>ignore</b> just "amino"
	(c)	oxygen(1) carbon dioxide (1)	2	<b>allow</b> $O_2$ and O <b>allow</b> $CO_2$ penalise incorrect subscript or CO or Co if answer line is blank credit correctly labelled answer in list.
		<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	DNA (1)	1	<b>allow</b> deoxyribose nucleic acid
	(b) (i)	19 (1)	1	
	(ii)	<p><b>idea</b> that black is dominant / white is recessive (1)</p> <p><b>idea</b> of (black gene) inherited / passed on / passed down <b>from father</b> (1)</p>	2	<p><b>allow</b> black fur / black cat / dad is dominant  <b>not</b> references to chromosomes e.g. "black chromosome is dominant" scores 0</p> <p><b>ignore</b> black overpowers white or black is stronger than white or dad's DNA is stronger  e.g. the black gene from the father is dominant scores 2</p> <p><b>allow</b> father was homozygous (for black) / father is BB  <b>ignore</b> references to the kittens being heterozygous</p>
	(iii)	any correctly named environmental factor / age/ gender/ different genes or DNA (1)	1	<b>allow</b> "the environment" / diet / illness <b>allow</b> higher level answers e.g. "lack of oxygen during pregnancy" <b>ignore</b> any other references to parents or growth rates
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	<p><b>any two from</b></p> <p>impaired judgement / loss of concentration (1)</p> <p>poor balance / dizziness (1)</p> <p>poor muscle control / coordination (1)</p> <p>blurred vision (1)</p> <p>vasodilation / heat loss (1)</p> <p>makes you sleepy / tired (1)</p> <p>reaction (time) affected / slows down nervous system/AW (1)</p> <p>slurred speech (1)</p> <p>idea of memory loss (1)</p> <p>lowers inhibitions e.g. more confidence (1)</p> <p>depression (1)</p>	2	<p><b>ignore</b> feels drunk / causes nausea</p> <p><b>allow</b> lowers awareness</p> <p><b>allow</b> no control</p> <p><b>ignore</b> bad sight</p>
	(b)	<u>cirrhosis</u>	1	<p><b>ignore</b> liver damage / liver disease / liver cancer</p> <p><b>allow</b> phonetically correct spellings e.g. seroses (1)</p> <p><b>not</b> sclerosis</p>
		<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance
5	(a) (i)	eggs (1)	1	if answer line blank, <b>allow</b> correctly indicated answer on pictures multiple answers score 0
	(ii)	potatoes (1)	1	if answer line blank, <b>allow</b> correctly indicated answer on pictures multiple answers score 0
	(b)	potatoes / eggs / (any suitable) meat / (any suitable) vegetable / fish / turkey / rice / pasta (1)	1	<b>ignore</b> chicken <b>allow</b> any food usually cooked
	(c)	new substance formed / difficult to reverse (1)	1	<b>allow</b> energy change takes place / colour change <b>ignore</b> shape / appearance / texture / references to change of state
		<b>Total</b>	<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	perfume (particles) can (easily) reach the nose (1)	1	<b>allow</b> so you can smell it <b>allow</b> so it can spread out / to spread the smell (AW) <b>allow</b> idea of drying e.g."so it dries" or "so it does not run"  <b>ignore</b> for the scent to come out <b>but</b> spread out into the air scores 1
	(b)	<b>any two from</b> non-toxic (1)  does not react with water (1)  does not irritate skin (1)  insoluble in water (1)  does not stain clothes (1)  must have a (nice) smell /scent (1)	2	<b>ignore</b> references to 'safe to use'  <b>allow</b> waterproof / does not wash off easily
	(c)	ensure that they are safe (to use) / to see side effects / if they irritate or harm or damage (skin) (1)	1	<b>not</b> to see if they are ok to use /could kill humans <b>ignore</b> cause reaction (to humans) <b>allow</b> cause bad reaction (to humans)
		<b>Total</b>	4	

Question		Expected Answers	Marks	Additional Guidance								
7	(a)	<p>fizzy pop bottles (1)</p> <p>won't shatter or break (when dropped) / resists attack by water or acids (1)</p>	2	<p>if answer line is blank, allow fizzy bottles ticked, underlined or circled or if indicated in explanation</p> <p>the second mark is conditional on correctly identifying fizzy pop bottles</p> <p><b>allow</b> low density <b>ignore</b> properties not on the list</p> <p>any reference to low melting point or flexible loses 2<sup>nd</sup> mark</p>								
	(b)	does not decay / does not decompose / idea that it takes a long time to break down (1)	1	<p><b>allow</b> does not rot / does not break down <b>ignore</b> waste away <b>ignore</b> does not break up <b>ignore</b> does not disintegrate / does not deteriorate / does not degrade</p>								
	(c)	<p><b>any two from:</b></p> <table> <tr> <td><u>method</u></td> <td><u>problem caused</u></td> </tr> <tr> <td>use of landfill sites / bury underground (1)</td> <td>because it takes up valuable space (1)</td> </tr> <tr> <td>burning/incineration</td> <td>but makes (toxic) gases / adds to greenhouse gases or effect or global warming / wastes a valuable resource (1)</td> </tr> <tr> <td>recycling (1)</td> <td>but expensive to achieve / sorting plastics is difficult / saves valuable resources (1)</td> </tr> </table>	<u>method</u>	<u>problem caused</u>	use of landfill sites / bury underground (1)	because it takes up valuable space (1)	burning/incineration	but makes (toxic) gases / adds to greenhouse gases or effect or global warming / wastes a valuable resource (1)	recycling (1)	but expensive to achieve / sorting plastics is difficult / saves valuable resources (1)	2	<p><b>look for two methods, if only one method give credit for correct problem caused</b></p> <p><b>allow</b> use a tip (1)</p> <p><b>ignore</b> simple references to pollution</p> <p><b>ignore</b> melting</p> <p><b>ignore</b> references to reusing</p>
<u>method</u>	<u>problem caused</u>											
use of landfill sites / bury underground (1)	because it takes up valuable space (1)											
burning/incineration	but makes (toxic) gases / adds to greenhouse gases or effect or global warming / wastes a valuable resource (1)											
recycling (1)	but expensive to achieve / sorting plastics is difficult / saves valuable resources (1)											
		<b>Total</b>	<b>5</b>									

Question		Expected Answers	Marks	Additional Guidance
8	(a) (i)	heat (1)	1	allow if answer line is blank credit correctly indicated answers in list
	(ii)	sound (1)	1	allow if answer line is blank credit correctly indicated answers in list
	(b)	<u>exothermic</u> (1)	1	<b>not</b> burning or neutralisation
	(c)	(spirit / fuel / liquid / named fuel) <u>burner</u> (1)	1	<b>not</b> Bunsen burner <b>ignore</b> lamp
	(d)	carbon - 2 (1) hydrogen - 6 (1)	2	
	(e)	oxygen (1)	1	allow O <sub>2</sub> <b>not</b> O
		<b>Total</b>	<b>7</b>	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	(i) idea of reflection (of microwaves) (1)	1	<b>allow</b> reflection of heat <b>allow</b> not absorbing microwaves <b>allow</b> to stop microwaves escaping / to keep microwaves in <b>allow</b> because microwaves cannot travel through metal  <b>ignore</b> references to microwaves bouncing (off walls) <b>ignore</b> prevents heat escaping <b>ignore</b> references to conduction
		(ii) microwaves or radiation or energy go through or refract through glass (1)	1	<b>allow</b> (microwaves) not reflected or absorbed by glass <b>allow</b> glass is not heated by microwaves  <b>ignore</b> references to melting <b>not to allow</b> heat /heat (energy) to go through
		(iii) water absorbs microwaves / water heated (by microwaves) / (water) particles gain energy or move faster or vibrate more (1)	1	<b>allow</b> microwaves / "they" go into the water <b>allow</b> water heated faster <b>allow</b> it gets hot or hotter <b>ignore</b> water absorbs heat <b>ignore</b> references to speed of cooking
	(b)	C (1)  wavelength (1)	2	
		<b>Total</b>	5	

Question		Expected Answers	Marks	Additional Guidance
10	(a) (i)	100 (1)	1	<b>allow</b> 200 / 2  if answer line is blank, credit correct answer in table or diagram
	(ii)	20 (1)	1	<b>allow</b> 5000 / 250  if answer line is blank, credit correct answer in table or diagram
	(iii)	air is trapped / AW (1)  air is an insulator or poor conductor (1)  idea of less / reduced / little convection (1)	2	<b>not</b> heat trapped <b>allow</b> warm air trapped
	(iv)	carpets / underlay / curtains / draught proofing / draught excluders / (cavity) wall insulation (1)	1	<b>allow</b> put on extra clothing <b>not</b> loft / roof insulation or double / triple glazing <b>ignore</b> use of reflective /silver / shiny foil / reference to turning down the heating <b>not</b> just floor insulation <b>but</b> under floor insulation scores (1)
	(b)	(degrees) Celsius / centigrade / °C (1)  joules or J (1)	2	<b>allow</b> Kelvin / K (1) Fahrenheit / °F (1) <b>not</b> merely degrees (°)  <b>allow</b> kJ or MJ or kWh or kilowatt hour(s) (1) if word is correct ignore symbols
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	cause skin cancer / eye damage / skin damage (1)	1	<p>not merely cancer / damage / suntan</p> <p>allow (sun)burn</p> <p>allow skin ageing</p>
	(b)	<p><b>any two from:</b></p> <p>(Rico's skin / dark skin) contains (more) melanin or pigment (1)</p> <p>(darker skins) absorb <b>more</b> UV or radiation (1)</p> <p>less or no UV or radiation reaches (inner) tissues / AW (1)</p>	2	<p>allow RA in terms of light skin</p> <p>allow "more melanin (which) absorbs UV or radiation" scores 2</p> <p>allow stops UV reaching the (inner) tissues (1)</p> <p>ignore references to filtering out the UV</p>
	(c)	<p><b>any two from</b></p> <p>reduces damage or risk (1)</p> <p>allows longer exposure (without damage) / can stay in sun longer (1)</p> <p>less UV / radiation gets through (1)</p>	2	<p>allow idea of increased / more / better protection (1)</p> <p>ignore references to cream lasting longer</p>
		<b>Total</b>	<b>5</b>	

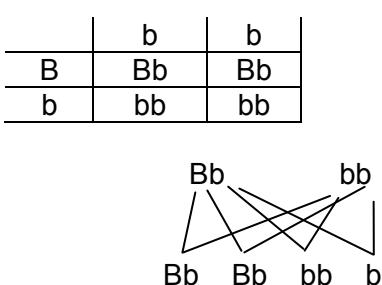
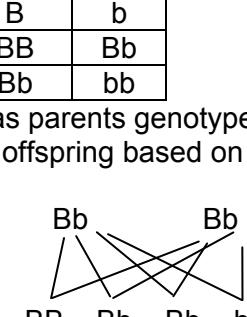
Question		Expected Answers	Marks	Additional Guidance
12		analogue (1) burglar alarms (1) reflection (1)	3	<b>correct order required</b>  must clearly be reflection and <b>not</b> refraction
		<b>Total</b>	<b>3</b>	
		<b>Overall Total</b>	<b>60</b>	

# B621/02 Unit 1: Modules B1, C1 and P1 Higher Tier

Question		Expected Answers	Marks	Additional Guidance
1	(a) (i)	dehydration (1)	1	if answer line is blank, <b>allow</b> dehydration circled, underlined or ticked in list above
	(ii)	homeostasis (1)	1	<b>allow</b> negative feedback
	(b) (i)	<b>any one from</b> take malaria tablets (1)  use insect repellent or insecticide (1)  description of way to prevent being bitten (1)	1	<b>allow</b> named anti-malarial drugs e.g. Iarium, quinine <b>ignore</b> reference to injections / vaccination / immunisation /inoculation  e.g. cover up / use mosquito net / avoid areas or times where there are mosquitoes / wear protective clothing
	(ii)	mosquito (1)	1	<b>allow</b> <i>anopheles</i> <b>allow</b> mosquito bite
		<b>Total</b>	<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
2	(a) (i)	60 (1)	1	no need to show working
	(ii)	amino acids (1)	1	<b>allow</b> peptides <b>not</b> polypeptides  be tolerant of spelling <b>ignore</b> just "amino"
	(b)	contains (all) the essential amino acids / have amino acids the body can't make (1)	1	<b>ignore</b> references to essential proteins <b>allow</b> no essential amino acids missing
	(c)	<b>any one from</b> burst blood vessels (1) damage to brain / kidney / eye (1) stroke (1) heart disease / heart attack (1)	1	  <b>allow</b> angina  <b>not</b> fainting
		<b>Total</b>	4	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	A T C G (1)	1	<p>any order</p> <p><b>allow</b> all 4 correct words instead of symbols adenine, thymine, cytosine, guanine (1)</p> <p><b>allow</b> combination of words and letters</p>
	(b) (i)	19 (1)	1	
	(ii)	<p><b>idea</b> that black is dominant / white is recessive (1)</p> <p><b>idea</b> of (black gene) inherited / passed on / passed down <b>from father</b> (1)</p>	2	<p><b>USE TICKS IN THIS QUESTION</b></p> <p><b>allow</b> black fur / black cat / dad is dominant</p> <p><b>not</b> references to chromosomes e.g. "black chromosome is dominant" scores 0</p> <p><b>ignore</b> black overpowers white or black is stronger than white or dad's DNA is stronger</p> <p><b>allow</b> father was homozygous (for black) / father is BB</p> <p><b>ignore</b> references to the kittens being heterozygous</p> <p>e.g. the black gene from the father is dominant scores 2</p>

Question		Expected Answers	Marks	Additional Guidance																		
	(c)	<p>correct genotype for both parents Bb and bb / correct gametes B and b and b and b (1)</p> <p>genotype of offspring Bb and bb correctly shown(1)</p> <p>phenotype of offspring / clear identification of which phenotype gives white cats and black cats (1)</p>	3	<p><b>USE TICKS IN THIS QUESTION</b></p> <p>correct Punnett squares or spaghetti diagram without labels scores (2)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td><td>b</td><td>b</td></tr> <tr> <td>B</td><td>Bb</td><td>Bb</td></tr> <tr> <td>b</td><td>bb</td><td>bb</td></tr> </table>  <p>If, in addition bb is white and Bb is black then scores 3<sup>rd</sup> mark BUT</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td><td>B</td><td>b</td></tr> <tr> <td>B</td><td>BB</td><td>Bb</td></tr> <tr> <td>b</td><td>Bb</td><td>bb</td></tr> </table> <p>this loses first mark as parents genotype is incorrect, but ECF on identifying offspring based on these parents</p> 		b	b	B	Bb	Bb	b	bb	bb		B	b	B	BB	Bb	b	Bb	bb
	b	b																				
B	Bb	Bb																				
b	bb	bb																				
	B	b																				
B	BB	Bb																				
b	Bb	bb																				
		<b>Total</b>	7																			

Question		Expected Answers	Marks	Additional Guidance
4	(a)	depressant (1)	1	if more than one boxed ticked, scores 0
	(b) (i)	synapse (1)	1	<b>allow</b> synaptic gap / synaptic cleft <b>ignore</b> just gap / cleft
	(ii)	<b>any two from</b> idea of (neuro)transmitter or chemical (1) (chemical) diffuses (1) (binds with) receptors (1)	2	<b>USE TICKS IN THIS QUESTION</b> <b>allow</b> acetylcholine (ACh) (1) <b>allow</b> just diffusion for one mark <b>ignore</b> idea of <b>impulse</b> diffusing across the gap eg “it diffuses” for the second mark
	(c)	<u>cirrhosis</u>	1	<b>ignore</b> liver damage / liver disease / liver cancer <b>allow</b> phonetically correct spellings eg seroses <b>not</b> sclerosis
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
5	(a) (i)	eggs (1)	1	if answer line blank, <b>allow</b> correctly indicated answer on pictures multiple answers score 0
	(ii)	potatoes (1)	1	if answer line blank, <b>allow</b> correctly indicated answer on pictures multiple answers score 0
	(b)	kill microbes or bacteria / improve the texture / improve the taste / make it easier to digest (1)	1	<b>ignore</b> kill germs <b>allow</b> kills named microbes e.g. bacteria, fungi, protozoa, salmonella, parasites <b>ignore</b> kills virus <b>ignore</b> references to removing poisons <b>allow</b> prevent food poisoning <b>allow</b> denatures proteins
	(c)	<b>any two from</b> shape (of protein molecule) changes (1)  process is irreversible / (protein is) permanently changed (1)  (process is called) denaturing / protein is denatured (1)	2	<b>USE TICKS IN THIS QUESTION</b>  <b>allow</b> protein (molecule) breaks down / breaks up <b>allow</b> protein (molecule) unfurls <b>ignore</b> protein molecule expands / shrinks / changes state  e.g. molecule changes shape (1) and stays like that (1)  <b>allow</b> denaturisation  <b>ignore</b> proteins die
		<b>Total</b>	5	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	perfume (particles) can (easily) reach the nose (1)	1	<b>allow</b> so you can smell it (1) <b>allow</b> so it can spread out / to spread the smell / AW (1) <b>allow</b> idea of drying e.g. "so it dries" or "so it does not run"  <b>ignore</b> for the scent to come out <b>but</b> spread out into the air scores 1
	(b)	(high energy) particles escape from liquid (1)  forces or attractions between the particles in the liquid overcome or weakened or broken (1)	2	<b>USE TICKS IN THIS QUESTION</b>  <b>allow</b> idea of particles become more spread out or separated (1) <b>ignore</b> references to diffusion  <b>allow</b> bonds instead of forces
	(c)	<b>any one from:</b>  cruel (to animals) / ethical objection (1)  may work differently in different species / animals are not the same as humans (1)	1	<b>allow</b> it could hurt / harm / kill animals / inhumane <b>allow</b> references to animal rights e.g. animal can't speak for itself e.g. some people think animals have the same rights as humans e.g. animals have no control over what happens to them  e.g. it might not hurt the animal but could harm the human <b>allow</b> may give unreliable or inaccurate results
		<b>Total</b>	4	

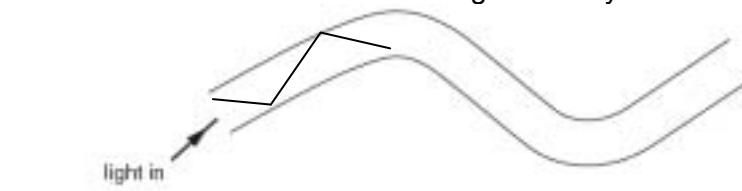
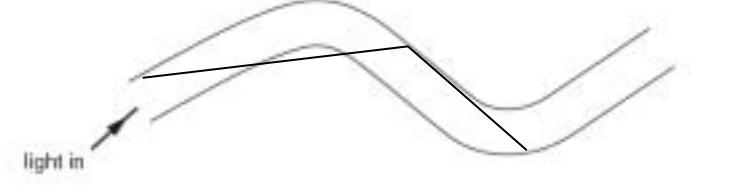
Question		Expected Answers	Marks	Additional Guidance
7	(a)	fizzy pop bottles (1)  won't shatter or break (when dropped) / resists attack by water or acids (1)	2	if answer line is blank, allow fizzy bottles ticked, underlined or circled or if indicated in explanation  the second mark is conditional on correctly identifying fizzy pop bottles  <b>allow</b> low density (1) <b>ignore</b> properties not on the list  any reference to low melting point or flexible loses 2 <sup>nd</sup> mark
	(b) (i)	(forces or bonds between polymer chains) are weak (1)	1	<b>allow</b> polymer chains are not connected together <b>allow</b> it has no cross-linking <b>allow</b> no bonds between polymer chains  any reference to bonds <b>within</b> the molecule are weak scores 0
	(ii)	cross links or bonds between chains prevent movement of chains (past each other) (1)	1	<b>allow</b> strong intermolecular bonds  <b>ignore</b> strong intermolecular forces between molecules  <b>ignore</b> polymer has strong bonds – must have idea of bonds <b>between</b> polymer molecules
		<b>Total</b>	4	

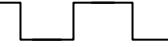
Question		Expected Answers	Marks	Additional Guidance
8	(a)	paraffin(1) idea of least (mass of) fuel to produce same energy change (1)	2	<b>allow</b> 0.5  explanation mark is dependent on identifying correct fuel
	(b)	<u>exothermic</u> (1)	1	<b>not</b> burning or neutralisation
	(c)	100 x 4.2 x 20 (1) <b>but</b> 8400 (J) scores 2	2	<b>allow</b> 67.2 (J) or 0.8 x 4.2 x 20 (1)  if candidate continues calculation to calculate energy per gram, <b>allow</b> 10,500 (J/g) scores 2
	(d)	ethanol + oxygen → carbon dioxide + water (1)	1	<b>allow</b> correct formulae or mixture of words and formulae eg $C_2H_5OH + O_2 \rightarrow CO_2 + H_2O$ (1) eg ethanol + $O_2 \rightarrow$ carbon dioxide + $H_2O$ (1) <b>allow</b> = instead of → <b>not</b> ethanol + O → carbon dioxide + $H_2O$ <b>not</b> + energy must use ethanol not just fuel <b>ignore</b> balancing if "and" used in the equation, scores 0
	(e)	$  \begin{array}{ccc}  \begin{array}{c} H \\   \\ H-C-H \\   \\ H \end{array} & + & 2 O=O \longrightarrow \begin{array}{c} O \\    \\ C \\    \\ O \end{array} + 2 \begin{array}{c} H \\   \\ H-O-H \\   \\ H \end{array}  \end{array}  $ <p style="text-align: center;"><b>OR</b></p> $  \begin{array}{ccc}  \begin{array}{c} H \\   \\ H-C-H \\   \\ H \end{array} & + & O=O \longrightarrow \begin{array}{c} O \\    \\ C \\    \\ O \end{array} + \begin{array}{c} H \\   \\ H-O-H \\   \\ H \end{array}  \end{array}  $	1	<b>allow</b> $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ or mix of molecular formulae and displayed formulae  <b>allow</b> = instead of →  <b>allow</b> correct multiples  watch for balancing on existing equations
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
9	(a) (i)	Idea of reflection (of microwaves) (1)	1	<b>allow</b> reflection of heat <b>allow</b> not absorbing microwaves <b>allow</b> to stop microwaves escaping / to keep microwaves in <b>allow</b> because microwaves cannot travel through metal  <b>ignore</b> references to microwaves bouncing (off walls) <b>ignore</b> prevents heat escaping <b>ignore</b> references to conduction
	(ii)	microwaves or radiation or energy go through or refract through glass (1)	1	<b>allow</b> (microwaves) not reflected or absorbed by glass <b>allow</b> glass is not heated by microwaves  <b>ignore</b> references to melting <b>not to allow</b> heat /heat (energy) to go through
	(b) (i)	water particles vibrate more or move more quickly / water molecules gain (kinetic) energy (1)	1	<b>ignore</b> 'move around more' <b>ignore</b> heating of particles eg it heats them up
	(ii)	conduction or convection (heats the rest of the food) (1)	1	<b>allow</b> higher level answers e.g. the vibrations in water molecules passed on (to other particles) <b>allow</b> (heat) energy is passed on (to other particles) <b>ignore</b> heat passed on <b>allow</b> idea of movement of warm water molecules <b>ignore</b> radiation
	(c)	cooking oil has a lower (specific) heat capacity  OR  oil contains less heat or energy (1)	1	<b>ignore</b> oil hotter / water colder  <b>allow</b> correct reverse argument  <b>allow</b> it takes less energy to heat it  assume "it" refers to cooking oil unless stated e.g. it has a lower shc (1)
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
10	(a)	<p><b>any three from</b></p> <p>idea of transfer of energy from warm air to glass (1)</p> <p>idea of increased vibration of (glass) particles (1)</p> <p>idea of collisions or transfer of energy between (glass) particles (1)</p> <p>idea of collisions or transfer of energy (from glass) to (cool) <b>air particles</b> (1)</p>	3	<p><b>USE TICKS IN THIS QUESTION</b></p> <p><b>allow</b> reference to molecules instead of particles</p> <p>any references to heat particles scores 0</p>
	(b) (i)	100 (1)	1	<p><b>allow</b> 200 / 2 (1)</p> <p>if answer line is blank, credit correct answer in table or diagram</p>
	(ii)	20 (1)	1	<p><b>allow</b> 5000 / 250 (1)</p> <p>if answer line is blank, credit correct answer in table or diagram</p>
	(c)	<p>4000 (2)</p> <p><b>BUT</b> <math>\frac{3000}{0.75}</math> or <math>\frac{3000 \times 100}{75}</math> or <math>\frac{3000}{75\%}</math> or <math>\frac{3000 \times 4}{3}</math></p> <p>scores 1</p>	2	only look for the working out mark if the final answer is incorrect
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	12 (1)	1	if answer line is blank allow 12 underlined, ticked or circled
	(b)	<p><b>any two from:</b></p> <p>(Rico's skin / dark skin) contains (more) melanin or pigment (1)</p> <p>(darker skins) absorb <b>more</b> UV or radiation (1)</p> <p>less or no UV or radiation reaches (inner) tissues / AW (1)</p>	2	<p><b>USE TICKS IN THIS QUESTION</b></p> <p><b>allow</b> ora in terms of light skin</p> <p><b>allow</b> "more melanin which absorbs UV or radiation" scores 2</p> <p><b>allow</b> stops UV reaching the (inner) tissues</p> <p><b>ignore</b> references to filtering out the UV</p>
		<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance
12	(a) (i)	<p>reflection in text or shown once correctly on diagram scores (1)</p> <p>BUT</p> <p>total internal reflection in text or from correctly labelled diagram scores (2)</p>	2	<p><b>Ignore</b> bouncing  <b>Ignore</b> references to refract</p> <p>mark text first</p> <p>on diagram, reflections must be at surface of fibre. Angles of reflection do not have to be accurate. Ignore entry and exit rays</p>  <p>scores 1 for correct reflection idea</p>  <p>scores 0 as ray is not contained within fibre</p>

		(ii)	analogue continuously variable or has many values OR digital in steps / digital is either on or off or 1 and 0 (1)	1	for digital allow in steps or high and low (1) allow correct diagram e.g. digital is  analogue is 
		(b) (i)	multiplexing or many signals can be interleaved / AW (1)	1	<b>not</b> ideas about different frequencies  <b>allow</b> multiple signals can be sent on a single channel <b>ignore</b> can send multiple signals
		(ii)	noise is not recognised (1)	1	<b>allow</b> noise or interference is not amplified  <b>allow</b> receiver can tell the difference between 1s and 0s even with noise or interference  <b>allow</b> digital can reject noise or interference ORA <b>allow</b> digital signals can be corrected
		<b>Total</b>		<b>5</b>	
		<b>Overall Total</b>		<b>60</b>	

# B622/01 Unit 2: Modules B2, C2 and P2 Foundation Tier

Question		Expected Answers	Marks	Additional Guidance
1	(a)	ants – pooter beetles – pit-fall trap butterflies – net  <b>all correct (2)</b> <b>one or two correct (1)</b>	2	
	(b) (i)	<b>any two from</b> size / length / width (1) different (pattern) / (different) markings / (different number of) spots (1) (different) antennae (1) (different) legs (1) (different) eyes (1) (different) mouth parts (1) (different) wing covers (1) (different) shape (1)	2	<b>allow</b> (different) colour (1)  <b>ignore</b> all have spots  <b>not</b> number of antennae <b>not</b> number of legs  <b>allow</b> different shells
	(ii)	B and E (1) look similar / look same / same number of spots / same characteristics (1)	2	second mark is <b>dependent</b> on B and E being stated <b>allow</b> same size (1) <b>ignore</b> similar spots
	(c)	fossils (1)	1	<b>allow</b> specific examples, e.g. in amber / impressions in rocks <b>allow</b> beetles turned into rock
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	bird (1) predator (1)	2	<b>allow</b> either order <b>allow</b> other ways of showing answers such as ringing or underlining words answers on answer line takes precedence
(b)		<b>any four from</b>  large claws / sharp claws / long claws / strong claws (1) to hold fish / to grip fish / to kill fish / to carry fish / AW (1)  sharp beak / strong beak / pointed beak / hooked beak (1) to tear fish / kill fish / AW (1)  powerful wings / large wings / strong wings / big wings (1) to chase (fish) / carry away fish / glide over water / AW (1)  eyes at front of head (1) to judge distance (1)  good eyesight / sharp eyesight (1) spot prey from distance (1)	4	<b>maximum of 3 marks</b> if only features are written <b>maximum of 3 marks</b> if only reasons are given  four marks must have <b>at least one</b> feature and <b>one reason</b>  beware of giving marks for catching or hunting fish (given in stem)  <b>ignore</b> long beak <b>ignore</b> to eat fish  <b>allow</b> large wingspan <b>allow</b> to fly faster  <b>ignore</b> eyes on side of head
(c)		(in danger of) becoming extinct / dying out (1)	1	<b>allow</b> not many left / population very low <b>not</b> population has been wiped out but <b>allow</b> population likely to be wiped out <b>not</b> it is extinct <b>ignore</b> population decreasing
Total			7	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	water (1) oxygen (1)	2	must be in <b>correct</b> order <b>allow</b> $H_2O$ <b>allow</b> $O_2$ if both word and formulae given <b>ignore</b> incorrect formula <b>not</b> O
	(b)	reduce carbon dioxide (in air) / trees take in carbon dioxide / carbon dioxide used in photosynthesis / AW (1)	1	<b>allow</b> remove carbon dioxide <b>not</b> plants breathe in carbon dioxide <b>ignore</b> plants breathe out oxygen
	(c)	tall trees get more light / small trees get less light (1)	1	<b>allow</b> not enough light (for small trees) / small trees shaded from the light <b>ignore</b> competition for nutrients / water <b>not</b> tall trees absorb light / tall trees absorb all the light / small trees get no light <b>not</b> tall trees block out the light but <b>allow</b> block out some of the light
	(d)	(make it from) glucose (1)	1	<b>ignore</b> photosynthesis <b>allow</b> carbon dioxide <b>and</b> water / carbon, hydrogen <b>and</b> oxygen / starch / sugar (1) <b>not</b> glucose and an incorrect substance e.g. glucose + amino acid
	(e)	living organism that lives on another living organism that cause it harm / AW (1)	1	living organism can be a plant or an animal answer <b>must</b> imply harm e.g. animal that lives off another in a win lose situation
		<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	molten rock cools down / magma cools down / lava cools down / liquid rock cools down (1)	1	<b>allow</b> molten rock crystallises / magma crystallises / lava crystallises <b>allow</b> molten rock solidifies / magma solidifies / lava solidifies / liquid rock solidifies <b>allow</b> molten rock hardens / magma hardens / lava hardens / liquid rock hardens <b>not</b> liquid rock dries out etc.
	(b)	molten rock (that erupts from a volcano) (1)	1	<b>allow</b> liquid rock / melted rock <b>allow</b> magma that erupts from a volcano but <b>not</b> just magma <b>not</b> liquid rock under the Earth's surface / magma under the Earth's surface / liquid rock cools down / hot rock <b>ignore</b> liquid substance - must state rock or imply rock e.g. lava or magma
	(c)	<b>any two from</b> predict future eruptions / warn people when volcano will erupt / AW (1)  to see if the volcano is active or dormant / find out why eruptions happen / find out how eruptions happen / research the structure of volcano / AW (1)  gain information on the Earth's structure / study plate tectonics / study rocks under the Earth's surface / AW (1)	2	<b>allow</b> to find out about volcanoes (1)
		<b>Total</b>	4	

Question		Expected Answers	Marks	Additional Guidance
5	(a) (i)	amalgam- mercury brass- copper and zinc solder- lead and tin  <b>all three</b> correct (2) <b>one or two</b> correct (1)	2	
	(ii)	amalgam - filling teeth solder - joining electrical components steel - making car bodies  <b>all three</b> correct (2) <b>one or two</b> correct (1)	2	
	(b)	electrolysis (1)	1	<b>allow</b> other ways of indicating correct answer such as ringing answer, underling answer or ticking answer answer on answer line takes precedence
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	density - low density (1) corrosion - rusts / corrodes (1) elec conductor - good electrical conductor (1)	3	<b>allow</b> lower density / less dense (1) <b>allow</b> yes (1) <b>allow</b> conducts / yes / good (1)
	(b)	saves (natural) resources / reduces disposal problems (1)	1	<b>allow</b> saves money / saves energy / less mining / both are finite resources / reduces pollution / less greenhouse gases made / reduces greenhouse effect / reduces global warming / reduces waste / reduces use of land-fill sites / reduces amount of scrap metal / less harmful emissions <b>ignore</b> so it can be used again
<b>Total</b>			<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	zinc / hydrochloric acid (1)	1	<b>allow</b> zinc and hydrochloric acid <b>allow</b> Zn / HCl
	(b) (i)	6 (minutes) (1)	1	
	(ii)	acid runs out / AW (1)	1	<b>allow</b> no more acid / no more HCl / one of the reactants has run out <b>ignore</b> no more gas is made <b>not</b> zinc has run out
	(iii)	<b>any two from</b> increase temperature / heating (1) use more concentrated acid / AW (1) use powdered zinc / break zinc into smaller pieces (1) use a catalyst (1) stir / shake (1)	2	<b>allow</b> use a stronger acid / use a more pure acid (1)  <b>allow</b> explanations of methods given e.g. increase temperature (1) because particles have more energy (1) and more collisions (1) increase concentration (1) because particles are more crowded (1) and more collisions (1) powdered zinc (1) has more surface area (1) so more collisions (1)
	(c)	$Zn + 2HCl \rightarrow ZnCl_2 + H_2$ formulae (1) balancing (1)	2	<b>allow</b> = instead of an arrow <b>allow</b> any correct multiple <b>not</b> and or & instead of + balancing mark is dependent on correct formulae symbols must have correct upper and lower cases e.g. ZN, CL, ZN are incorrect. With C it is difficult to tell if it is upper or lower case so more latitude will have to be given
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	light (1) electricity (1) direct (1)	3	led is a useful way to remember the answer
	(b)	<b>any one from</b> low maintenance (1) no power cables / use in remote areas / no wires (1) long life (1) renewable energy source / sunlight does not run out (1) no polluting waste (1)  rugged (1) no need for fuel / energy resource is free / uses free energy (1)	1	<b>ignore</b> always available  <b>ignore</b> sun does not run out  <b>allow</b> no pollution / no waste / no greenhouse gases / no global warming effect <b>ignore</b> better for the environment  <b>ignore</b> cheaper / electricity is free
	(c)	<b>any one from</b> biomass / wood / straw / manure (1)  wind (1) water / waves / tide / hydroelectric power (1) geothermal (1)	1	<b>allow</b> suitable named plants e.g. tree, rape, sugar beet, sugar cane <b>ignore</b> plants on its own <b>allow</b> biofuels / bioethanol / biodiesel (1)
		<b>Total</b>	5	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	telescope / binoculars (1)	1	<b>allow</b> radio telescope / scanning from satellite
	(b)	ice <b>and</b> dust / ice <b>and</b> rock (1)	1	<b>both</b> needed for 1 mark
	(c)	elliptical (1)	1	<b>allow</b> egg shaped, oval <b>allow</b> correct answers in terms of distance from Sun at different points of orbit <b>allow</b> an oval diagram <b>not</b> eclipse / ecliptic i.e. words with a 'c' as the second letter
	(d)	<b>any two from</b> crater / (big) holes in ground (1) explosion at point of impact / hot rocks ejected / AW (1) death and destruction (1)  sunlight blocked (by dust) (1) climate change / ice-age (1) flooding (1)	2	<b>ignore</b> fires (given in stem)  <b>allow</b> people killed / cities or buildings destroyed / animals killed / plants killed / extinction of organisms (1) <b>ignore</b> destruction of planet  <b>allow</b> earthquakes / tsunami
	(e)	<b>any two from</b> unusual elements found / unusual rocks found / unusual minerals found (1) craters / (big) holes in ground (1) (sudden) change in fossil numbers (1) (sudden) change in type of fossil numbers (1)	2	<b>allow</b> rocks from space / rock from the asteroid / parts of asteroids found / AW (1)  <b>ignore</b> fire and animal extinction fossils on its own is <b>not</b> enough
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
10	(a)	alpha (1) gamma (1)	2	<b>allow</b> answers ticked or underlined  if <b>one</b> incorrect answer max 1 if <b>two</b> incorrect answers 0
	(b)	reduces / gets less / gets smaller (1)	1	<b>not</b> slows down
	(c)	<b>any two from</b> protective clothing / gloves / goggles / laboratory coat (1) keep distance (from class) / teacher as far as possible away from source (1) short exposure time (1) tongs / do not handle (1) shielded storage / lead box for storage (1) safety screen (1) no students to handle (1)	2	<b>ignore</b> masks
<b>Total</b>			<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	fridge used for longer / fridge used all the time / fridge used for more (1)	1	<b>allow</b> ora e.g. kettle used for less time / kettle not used as much <b>allow</b> calculation of kW-hours to show they are the same
	(b)	104 (1)	1	<b>allow</b> $52 \times 2$ <b>allow</b> £1.04 <b>allow</b> 1.04 if there is evidence of a correct calculation to get 104 e.g. $52 \times 2$
	(c)	watt(s) / kilowatt(s) (1)	1	<b>not</b> what <b>not</b> W / kW
<b>Total</b>			<b>3</b>	

		<b>Overall Total</b>	<b>60</b>	
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# B622/02 Unit 2: Modules B2, C2 and P2 Higher Tier

Question		Expected Answers	Marks	Additional Guidance
1	(a)	water (1) oxygen (1)	2	must be in <b>correct</b> order <b>allow</b> $H_2O$ <b>allow</b> $O_2$ <b>not</b> O if words and formula given <b>ignore</b> incorrect formula
	(b)	reduce carbon dioxide (in air) / trees take in carbon dioxide / carbon dioxide used in photosynthesis / AW (1)	1	<b>allow</b> remove carbon dioxide <b>not</b> plants breathe in carbon dioxide <b>ignore</b> plants breathe out oxygen
	(c)	tall trees get more light / small trees get less light (1)	1	<b>allow</b> not enough light (for small trees) / small trees shaded from the light <b>ignore</b> competition for nutrients / water <b>not</b> tall trees absorb light / tall trees absorb all the light <b>not</b> tall trees block out light <b>but allow</b> block out some of the light
	(d)	(make it from) glucose (1)	1	<b>ignore</b> photosynthesis <b>allow</b> carbon dioxide <b>and</b> water / carbon, hydrogen <b>and</b> oxygen / starch / sugar (1) <b>not</b> glucose and an incorrect substance e.g. glucose + amino acid
	(e)	living organism that lives on another living organism that cause it harm / AW (1)	1	living organism can be a plant or an animal answer <b>must</b> imply harm e.g. animal that lives off another in a win lose situation
		<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
2	(a) (i)	when lynx (predator) increase, hares (prey) decrease (1) when lynx decrease, hares increase (1)	2	<b>allow</b> idea of time delay (1) <b>allow</b> reference to size of peaks and troughs (1) <b>allow</b> inverse relationship (2)
	(ii)	foxes eat other things / rabbits have other predators / AW (1)	1	<b>allow</b> human influences e.g. hunting / myxomatosis <b>allow</b> foxes have other predators
	(b)	idea of limited hunting / set quotas / only kill a few at a time / AW (1)	1	Only kill as many as are born / enough left to breed / <b>allow</b> give time to breed. <b>ignore</b> reference to breeding in captivity
	(c)	spread load / spread weight / less pressure (1)	1	<b>allow</b> don't sink into snow <b>not</b> just increased surface area
	(d)	insects (1) colourful / bright / scented petals / flowers (1)	2	<b>allow</b> named examples of insects (1) <b>allow</b> produce nectar / smell / sticky pollen / shape = landing platform (1) <b>read</b> both parts and mark them together if wind mentioned in pollination max 1 for correct insect answer to second part. eg wind pollination X – bees attracted to petals collect pollen (1) <b>ignore</b> reference to other animals
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
3	(a) (i)	fossils not formed / fossils not found / fossils have been destroyed / fossilisation is a rare event (1)	1	<b>allow</b> fossils may be under the sea / in an inaccessible place
	(ii)	<b>any three from</b> idea of variation / mutations (1) idea of competition for limited resources (1) idea of survival of the fittest (1) idea of inheritance of successful characteristics (1)	3	<b>allow</b> Adapted to environment / had different characteristics eg fins / dolphins have flippers (1)  <b>allow</b> adaptations were advantageous to living in water / idea that adaptations helped them to survive (1)  <b>allow</b> characteristics / adaptations passed on (through breeding) (1) best adapted breed = (2)
	(b) (i)	mammals have lungs / fish have gills / mammal have fur / fish have (wet) scales / mammals produce milk / ora (1) mammals are warm blooded (1)	1	<b>allow</b> mammals have live young / fish lay eggs assume unqualified answers refer to mammals
	(ii)	live in similar / same environment / have similar / same way of life / they both live in the sea / need to swim (1)	1	<b>allow</b> convergent evolution / evolution of analogous organs
	(c)	ecosystem (1)	1	<b>allow</b> correct answer underlined, circled or ticked in list if answer line is blank
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	<b>any two from</b> predict future eruptions / warn people when volcano will erupt / AW (1)  to see if the volcano is active or dormant / find out why eruptions happen / find out how eruptions happen / research the structure of volcano (1)  gain information on the Earth's structure / study plate tectonics / study rocks under the Earth's surface / AW (1)	2	<b>allow</b> to find out about volcanoes
	(b)	slow cooling gives large crystals / fast cooling gives small crystals (1)	1	<b>allow</b> because rate of cooling is different / have different cooling times
	(c)	subduction (1)	1	
		<b>Total</b>	<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
5	(a)	amalgam- mercury brass- copper and zinc solder- lead and tin  <b>all three correct (2)</b> <b>one or two correct (1)</b>	2	
	(b)	copper sulfate solution impure copper anode  pure copper cathode	2	3 correct scores 2 1 or 2 correct scores 1
<b>Total</b>			<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	<b>any two from</b> transparent / can see through it (1) resistant to impact / does not break easily / can withstand collisions / shatterproof (1) can be toughened (1) easy to shape (1) waterproof /does not dissolve / react in water (1)	2	<b>ignore</b> strong or references to cleaning /scratchproof / hardwearing  <b>allow</b> inert / un-reactive (1) <b>ignore</b> just weatherproof
	(b) (i)	gives better fuel economy / cheaper to run / AW (1)	1	<b>allow</b> car will be lighter / weigh less / less mass can accelerate quicker/ travel faster  <b>not</b> aluminium will be lighter
	(ii)	aluminium will have a longer lifetime / AW (1)  because aluminium corrodes less than steel / steel rusts but aluminium does not does not corrode (1)	2	mark as one answer  <b>not</b> does not rust as an <b>explanation</b> for does not corrode <b>ignore</b> does not need painting  <b>allow</b> aluminium forms a protective coat /protective aluminium oxide / protective layer / protective film (1)  <b>if</b> no marks scored in part (i) and no marks scored in (ii) <b>allow 1 mark</b> for the answer to part (i) in part (ii)
		<b>Total</b>	5	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	10.5 - 12 (minutes) (1)	1	
	(b)	substance which speeds up a reaction (1)	1	<b>allow</b> remains unchanged / changes rate of reaction
	(c)	greater surface area / more frequent collisions / collisions more often / more chance of collision (1)	1	<b>allow</b> more exposed particles per unit surface area <b>not</b> just more collisions
	(d)	<b>any two from</b> particles move faster / particles have more energy (1) more frequent collisions / AW (1) more energetic / successful / effective collisions (1)	2	<b>ignore</b> vibrations  <b>allow</b> more chance of collisions (1) <b>allow</b> collisions are harder / more powerful / with more force (1)  <b>allow</b> more collisions scores 1 if no other marks awarded
	(e)	$Zn + 2HCl \rightarrow ZnCl_2 + H_2$ formulae (1) balancing (1)	2	<b>allow</b> = instead of an arrow <b>allow</b> any correct multiple <b>not</b> and or & instead of + balancing mark is dependent on correct formulae symbols must have correct upper and lower cases e.g. ZN, CL, ZN are incorrect. With C it is difficult to tell if it is upper or lower case so more latitude will have to be given
		<b>Total</b>	7	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	<b>any one from</b> low maintenance (1) no power cables / use in remote areas / no wires (1) long life (1) renewable energy source / sunlight does not run out (1) no polluting waste (1)  rugged (1) no need for fuel / energy resource is free / uses free energy (1)	1	<b>ignore</b> always available  <b>ignore</b> sun does not run out  <b>allow</b> no pollution / no waste / no greenhouse gases / no global warming effect (1) <b>ignore</b> better for the environment  <b>ignore</b> cheaper / electricity is free
	(b)	less light falling on photocell / effective photocell area reduced (1)	1	<b>not</b> no light <b>ignore</b> shaded
	(c)	(light) energy / photons absorbed by photocell (1)  <b>idea of</b> electrons knocked loose from silicon / atoms / particles in photocell (1)  electrons flow / idea of current if linked to electrons (1)	3	<b>ignore</b> sun or sunlight <b>allow</b> higher level answers hole / positive movement in p-type (1) electron / negative movement in n-type (1)  <b>allow</b> electrons leave / become free from atom / particle / silicon (1)
		<b>Total</b>	5	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	ice <b>and</b> dust / ice <b>and</b> rock (1)	1	<b>both</b> needed for 1 mark
	(b)	elliptical (1)	1	<b>allow</b> egg shaped, oval <b>allow</b> correct answers in terms of distance from Sun at different points of orbit <b>allow</b> an oval diagram <b>not</b> eclipse / ecliptic i.e. words with a 'c' as the second letter
	(c)	<b>any two from</b> unusual elements found / unusual rocks found / unusual minerals found (1) craters / (big) holes in ground (1) (sudden) change in fossil numbers (1) (sudden) change in type of fossil numbers (1)	2	<b>allow</b> rocks from space / rock from the asteroid / parts of asteroids found (1)  <b>ignore</b> fire and animal extinction  fossils on its own is <b>not</b> enough
<b>Total</b>			<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance	
10	(a)	cosmic rays (1) granite rocks (1)	2	if additional answers circled, -1 mark for each additional, minimum 0	
	(b)	particles can gain electrons owtte (1)	1	<b>ignore</b> reference to ionising radiation / heating	
	(c)	reduces / gets less / gets smaller (1)	1	<b>not</b> slows down	
	(d)	<b>any two from</b> landfill (1) encased in glass (1) buried underground / AW (1) reprocessed (1) piped out to sea (1) store in lead lined containers (1) store under water (1)	2	<b>allow</b> reused (1) put in steel drums	
		<b>Total</b>	6		

Question		Expected Answers	Marks	Additional Guidance
11	(a)	1200 (2) but $0.6 \div 0.5$ for 1	2	<b>allow</b> 1.2 kW (2) 1.2 W (1)
	(b)	7.2 (1)	1	<b>allow</b> 7 no ecf
	(c)	advantage costs less (1) disadvantage operating overnight (1)	2	<b>allow</b> idea of having to store overnight without knowing following day's demand - night storage heaters (1) <b>allow</b> additional meters / bill / standing charges (1) <b>not</b> always available
<b>Total</b>			<b>5</b>	
<b>Overall Total</b>			<b>60</b>	

# Grade Thresholds

General Certificate of Secondary Education  
 Science B (Specification Code J640)  
 January 2009 Examination Series

## Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
<b>B621/01</b>	Raw	60	-	-	-	33	27	21	16	11	0
	UMS	69	-	-	-	60	50	40	30	20	0
<b>B621/02</b>	Raw	60	43	34	25	17	12	9	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
<b>B622/01</b>	Raw	60	-	-	-	37	30	23	17	11	0
	UMS	69	-	-	-	60	50	40	30	20	0
<b>B622/02</b>	Raw	60	47	39	31	23	16	12	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0

## Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
<b>J640</b>	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
<b>J640</b>	0.7	7.8	29.9	62.1	86.5	93.8	97.9	99.4	100.0	676

For a description of how UMS marks are calculated see:  
[http://www.ocr.org.uk/learners/ums\\_results.html](http://www.ocr.org.uk/learners/ums_results.html)

Statistics are correct at the time of publication.

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