

Science B J640

Gateway Science Suite

General Certificate of Secondary Education

Mark Scheme for the Units

June 2009

J640/MS/R/09

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Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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CONTENTS

GCSE Gateway Science B J640

MARK SCHEMES FOR THE UNITS

Unit/Content	Page
Mark Scheme Guidance	1
B621/01 Unit 1: Modules B1, C1 and P1 Foundation	2
B621/02 Unit 2: Modules B1, C1 and P1 Higher	14
B622/01 Unit 1: Modules B2, C2 and P2 Foundation	28
B622/02 Unit 2: Modules B2, C2 and P2 Higher	40
Grade Thresholds	53

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

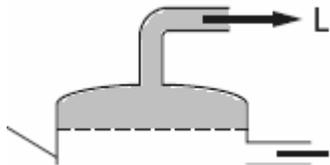
Question		Expected Answers	Marks	Additional Guidance
1	a	nucleus (1)	1	
	b	DNA (1)	1	allow dna / deoxyribonucleic acid / nucleic acid
	c	sexual reproduction / fertilisation (1)	1	ignore reproduction ignore conception ignore sexual intercourse
		Total	3	

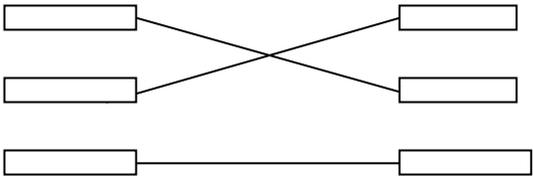
Question		Expected Answers	Marks	Additional Guidance
2	a	<p>any two from fast / AW (1)</p> <p>automatic / predictable / does not involve conscious thought / AW (1)</p> <p>protective / AW (1)</p>	2	<p>allow does not think about it</p> <p>allow she has no control</p> <p>allow she cannot stop her pupils from doing it</p> <p>allow happens unconsciously</p> <p>ignore does not involve the brain</p>
	b	electrical / impulse(s) (1)	1	allow higher level answers referring to release of chemicals across the synapse or ion migration
	c	genes (1)	1	more than one box ticked scores 0 if no box ticked allow correct answer underlined or circled
	d	(short term - no mark) soon wears off / she wakes up / temporary effects / not permanent / AW (1)	1	allow doesn't last long
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
3	a	<p>all 3 points correctly plotted (2) but 2 correctly plotted (1)</p> <p>smooth line through all points (1)</p>	3	<p>allow +/- half a square</p> <p>line mark is independent of plotting marks line must touch every cross and line must not go more than half a square below 62 multiple lines lose last marking point straight lines 'dot to dot' loses third mark</p>
	b	<p>any three from heart beats faster / muscles need more blood / increased blood flow (1)</p> <p>get more oxygen / get oxygen more quickly (1)</p> <p>get more glucose / get glucose more quickly (1)</p> <p>remove more carbon dioxide / remove carbon dioxide more quickly (1)</p> <p>to / from muscles (1)</p> <p>for more energy / respiration (1)</p>	3	<p>ignore heart pumps more blood</p> <p>allow reverse argument e.g heart was not beating fast enough so not enough oxygen (2)</p> <p>only allow muscles mark once, but must be in correct context</p>
		Total	6	

Question			Expected Answers	Marks	Additional Guidance
4	a	i	heat stroke / dehydration / death (1)	1	<p>allow higher level answers e.g. damage to enzymes or stops enzymes working or denatures enzymes or affect the way enzymes work</p> <p>ignore kills enzymes</p> <p>allow heat exhaustion or fainting or dizziness or headache</p> <p>allow idea of damage to (named) cells e.g. kills cells</p> <p>ignore burn or body becomes too hot or overheats</p> <p>ignore just 'stroke'</p> <p>ignore damage to any body part e.g. brain</p>
		ii	(heat needed for) evaporation (1)	1	<p>allow correct description of evaporation process</p> <p>allow higher level references to taking latent heat from the body</p> <p>not evaporation of heat</p> <p>ignore references to pores releasing water (onto skin)</p>
		iii	maintaining a constant internal environment / balancing bodily inputs and outputs / control of internal environment (1)	1	<p>allow maintain optimum status in the body</p> <p>allow examples of controlling or maintaining e.g. temperature, (blood) sugar level, carbon dioxide, water level, pH</p> <p>allow 'keeping the temperature the same' (as lowest level of acceptability)</p> <p>ignore 'drops (body) temperature' unless qualified by returning to normal</p>
	b		aspirin (1)	1	<p>allow correct answer underlined, circled or ticked if answer line is blank</p>
	c		(no - no mark) antibiotics (only) work against bacteria / fungi (1)	1	<p>allow antibiotics do not work against viruses or have no effect on viruses or cannot kill or fight off viruses</p> <p>ignore simply antibiotics do not work</p> <p>ignore references to antibodies and white blood cells</p> <p>ignore virus cannot be killed by drugs</p> <p>allow (yes - no mark) to prevent secondary infection</p>
	d		antigen (1)	1	<p>allow correct answer underlined, circled or ticked if answer line is blank</p>
			Total	6	

Question			Expected Answers	Marks	Additional Guidance
5	a	i	antioxidant (1)	1	allow answers where arrows are drawn from the correct response to the answer line
		ii	emulsifier (1)	1	allow answers where arrows are drawn from the correct response to the answer line
	b		mayonnaise / salad cream / salad dressings / eggs / tomato ketchup / biscuits / breakfast cereal / cakes / deserts / mousses / soft drinks / toffee / chewing gum / ice cream / dried potato / chocolate coatings / bread / margarine / low fat spreads / coffee whiteners / topping powders / peanut butter / caramels / cheese / milk drinks / yoghurt / frankfurters / mortadella / luncheon meat / pate / butter (1)	1	
	c		to improve or help the flavour or taste (1)	1	allow bring out / strengthen flavour allow crisps have no flavour, added to enhance flavour allow flavour not very strong so MSG enhances it allow to taste nicer (lowest limit of acceptability) ignore it is a flavour enhancer but allow it enhances the flavour ignore to make food more interesting ignore just change the flavour or add flavour ignore references to digestion / appearance ignore to make more / different flavours
			Total	4	

Question		Expected Answers	Marks	Additional Guidance
6	a	coal or (natural)gas or methane (1)	1	allow 'peat'
	b	i x inside column(to include exit tube) above top dotted lines (1) 	1	centre of cross must be on or above top dotted line
		ii petrol / naphtha / heating oil / fuel oil / bitumen / kerosene / lubricating oil / waxes (1)	1	ignore butane / propane ignore LPG, paraffin, diesel as in the question allow gasoline allow car oil allow aircraft fuel allow vaseline or petroleum jelly
	c	to make petrol / to make more useful substances (1) then one from catalyst (1) high temperature (1)	2	allow higher level answers e.g. makes alkanes (1) makes alkenes (1) which are used to make polymers (1) to match supply with demand / aw (1) allow porcelain allow hot or heat it up take care to look for contradictions e.g. heat and cool
Total			5	

Question		Expected Answers	Marks	Additional Guidance
7	a	insoluble - a solid that does not dissolve in a liquid solute - a dissolved solid in a solution solvent - a liquid that dissolves a solid 	2	all three correct scores 2 marks one or two correct scores 1 mark
	b	idea of safety (1)	1	e.g. because they might hurt you otherwise / could be dangerous / so they don't cause rashes / so they don't cause itchiness / so they don't cause skin damage
Total			3	

Question		Expected Answers	Marks	Additional Guidance
8	a	<p>any two from idea of availability / is it easy to get hold of / how long will it last (1)</p> <p>idea of renewable (1)</p> <p>idea of flammability / how well it burns (1)</p> <p>idea of pollution products / does it produce harmful substances when burned / does it have a clean flame / is it smelly / AW (1)</p> <p>idea of storage (1)</p> <p>idea of toxicity of fuel (1)</p> <p>idea of ease of use (1)</p> <p>idea of safety</p>	2	<p>allow can it run out / is it nearby / global stocks / how much in reserves ignore how much is needed ignore 'mass' on its own</p> <p>allow ease of burning / ease of ignition / explosive</p> <p>ignore environmentally friendly / does it harm the environment allow idea of contribution to global warming</p> <p>allow is it poisonous / must be non-poisonous / no harmful effects if in contact with people / will it irritate skin allow harmful</p> <p>allow is it easy to use / is it difficult to use / is it easy to light / is it a solid, liquid or gas</p> <p>allow is it safe</p> <p>ignore references to pay back time, efficiency or solar panels</p>
	b	carbon dioxide / CO ₂ (1)	1	<p>not CO₂ or CO² or Co₂ not carbon dioxide + heat</p>
	c	carbon monoxide /CO / poisonous gas formed (1)	1	<p>allow harmful / dangerous gas made allow less heat is produced</p>
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
9	a	hydrogen and carbon (1)	1	not 'hydro and carbon' not C and H
	b	propane (1)	1	allow C ₃ H ₈
	c	propane (1)	1	allow C ₃ H ₈
	d	CH ₄ O (1)	1	allow CH ₃ OH / COH ₄ / H ₄ CO / OH ₄ C / H ₄ OC not CH ₃ OH / CH ³ OH not CH ₄ O / CH ⁴ O allow C ₁ H ₄ O ₁
Total			4	

Question		Expected Answers	Marks	Additional Guidance		
10	a	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> gain drink ice cream </td> <td style="width: 50%; vertical-align: top;"> lose meal / food Justin lamp </td> </tr> </table>	gain drink ice cream	lose meal / food Justin lamp	3	all 5 in correct columns (3) 3 / 4 in correct columns (2) 1 / 2 correct column (s) (1) disregard objects that appear in both lists e.g if ice cream appears in both lists then max mark is 2 if all others are correct
gain drink ice cream	lose meal / food Justin lamp					
	b	joules (1)	1	allow J / kilojoules / calories / cal / kcal		
Total			4			

Question		Expected Answers	Marks	Additional Guidance
11	a	<p>any two from</p> <p>foam is a poor conductor / (good) insulator (1)</p> <p>foam contains air (bubbles) / air bubbles trapped (1)</p> <p>air or bubbles is poor conductor or (good) insulator (1)</p> <p>prevents or reduces convection (in cavity) (1)</p> <p>description of convection currents (1)</p> <p>idea of prevents or reduces or stops radiation or radiated heat (in the cavity) (1)</p>	2	<p>allow less conduction happens or conduction is more difficult</p> <p>allow foam stop conduction</p> <p>not air entering being trapped or warmed</p> <p>trapped air does not conduct (well) / insulates gains (2)</p> <p>allow stops convection / no (moving) air (particles) so no heat loss by convection</p>
	b	<p>(shiny foil) reflects heat (back into room) / (shiny foil) is a poor emitter (to outside) (1)</p>	1	<p>ignore references to heat bouncing off the foil</p> <p>allow heat reflected back into the wall</p> <p>not references to heat particles</p> <p>ignore reflects light</p>
		Total	3	

Question		Expected Answers	Marks	Additional Guidance
12	a	water (1)	1	allow moisture / H ₂ O / fat
	b	IR heats or is absorbed by surface or outer layer part of food or does not penetrate to the centre of the food (1) interior of food heated by conduction and/or convection (1)	2	any reference to IR penetrating the food loses this mark allow higher level descriptions of conduction and or convection
	c	i	1	allow temperature / thermal sensing allow mobile phones allow physiotherapy ignore just optical fibres ignore telephones, communication
		ii	1	allow correct diagram of an analogue wave e.g. 
		Total	5	

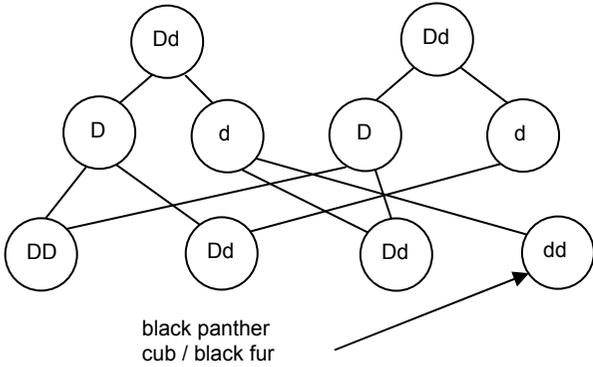
Question		Expected Answers	Marks	Additional Guidance
13	a	B and C (1)	1	both needed (any order) allow B and C ringed, underlined or ticked if answer line blank allow close curtains at night and insulation in the loft written on the answer line
	b	0.075 (2) but if answer is incorrect $15 \div 200 \times 100$ (1)	2	allow 7.5% if % shown clearly 7.5 on its own scores (1) Ignore any units other than % on answer line e.g. 0.075J or 0.075N scores 2 but 0.075% scores (1)
		Total	3	

Question		Expected Answers	Marks	Additional Guidance
14	a	x ✓ (✓) (✓) ✓	2	all three correct (2) one or two correct (1)
	b	300 000 000 (m / s) (2) but if answer is incorrect $3\ 000\ 000\ 000 \times 0.1$ (1)	2	allow 3×10^8 or 300×10^6 or other 'correct' standard form type of notation
	c	(all) travel at the same speed / 300 000 000 (m / s) / value given as answer to (b) (1)	1	allow all travel at the speed of light allow travels at different speed in different media / substances
		Total	5	

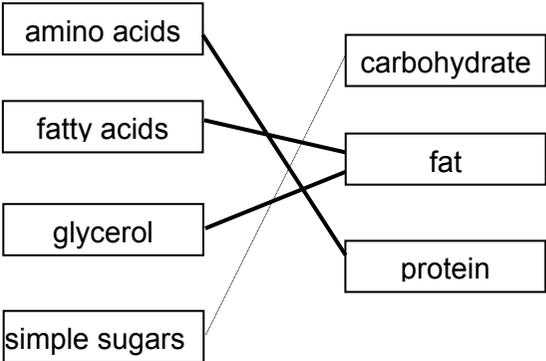
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B621/02 Unit 2: Modules B1, C1 and P1 Higher

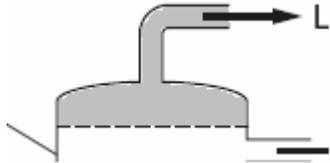
Question			Expected Answers	Marks	Additional Guidance
1	a	i	heat stroke / dehydration / death (1)	1	<p>allow higher level answers e.g. damage to enzymes or stops enzymes working or denatures enzymes or affect the way enzymes work</p> <p>ignore kills enzymes</p> <p>allow heat exhaustion or fainting or dizziness or headache</p> <p>allow idea of damage to (named) cells e.g. kills cells</p> <p>ignore burn or body becomes too hot or overheats</p> <p>ignore just 'stroke'</p> <p>ignore damage to any body part e.g. brain</p>
		ii	(heat needed for) evaporation (1)	1	<p>allow correct description of evaporation process</p> <p>allow higher level references to taking latent heat from the body</p> <p>not evaporation of heat</p> <p>ignore references to pores releasing water (onto skin)</p>
		iii	maintaining a constant internal environment / balancing bodily inputs and outputs / control of internal environment (1)	1	<p>allow maintain optimum status in the body</p> <p>allow examples of controlling or maintaining e.g. temperature, (blood) sugar level, carbon dioxide, water level, pH</p> <p>allow 'keeping the temperature the same' (as lowest level of acceptability)</p> <p>ignore 'drops (body) temperature' unless qualified by returning to normal</p>
	b		aspirin (1)	1	<p>allow correct answer underlined, circled or ticked if answer line is blank</p>
	c		(no - no mark) antibiotics (only) work against bacteria / fungi (1)	1	<p>allow antibiotics do not work against viruses or have no effect on viruses or cannot kill or fight off viruses</p> <p>ignore references to antibodies and white blood cells</p> <p>ignore virus cannot be killed by drugs</p> <p>allow (yes - no mark) to prevent secondary infection</p>
	d		antigen (1)	1	<p>allow correct answer underlined, circled or ticked if answer line is blank</p>
			Total	6	

Question			Expected Answers	Marks	Additional Guidance									
2	a	i	38 (1)	1										
		ii	19 (1)	1										
	b	i	different versions / types of the (same) gene (1)	1	allow specific examples e.g. D and d are alleles of gene allow one is recessive and one is dominant									
		ii	a correct diagram (1) black panther cub / black fur named or identified as dd (1)	2	no need to identify parents for correct diagram mark  <p>black panther cub / black fur</p> <p>middle stage not essential in diagram if 1st and 3rd stages correct ignore matching lines in above diagram just look for correct letters</p> <table border="1"> <tr> <td></td> <td>D</td> <td>d</td> </tr> <tr> <td>D</td> <td>DD</td> <td>Dd</td> </tr> <tr> <td>d</td> <td>Dd</td> <td>dd</td> </tr> </table> <p>dd → black panther cub</p> <p>allow dd circled but not labelled for second mark</p>		D	d	D	DD	Dd	d	Dd	dd
	D	d												
D	DD	Dd												
d	Dd	dd												
Total				5										

Question			Expected Answers	Marks	Additional Guidance
3	a	i	(becomes) thin(ner) / flat(tens) (1)	1	allow a before and after diagram ignore references to ciliary muscles or suspensory ligaments ignore smaller or bends/ longer focus or focal length / contracts / longer allow less curvature / less curved
		ii	<u>relaxes</u> (1)	1	ignore gets longer / expands / stretches
		iii	(become) tight(er) / taut (1)	1	ignore contract / stretches / squeezed / pulled / get longer
	b		any three from need more / extra oxygen / enough oxygen (1) (repay) <u>oxygen debt</u> (1) lactic acid built up / made or produced during run (1) (because of) anaerobic respiration (1) (oxygen needed) to break down / remove lactic acid / oxidise lactic acid (1)	3	ignore to recover ignore reference to aerobic respiration ignore just oxygen

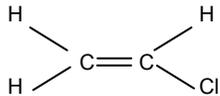
Question	Expected Answers	Marks	Additional Guidance
<p>c</p> <p>i</p>	<p>line from amino acids to protein (1)</p> <p>lines from fatty acids and glycerol to fat (1)</p> 	<p>2</p>	<p>both needed</p> <p>if more than 3 lines drawn deduct one mark for each extra line to a minimum of zero</p>
	<p>ii</p> <p>(food) can be absorbed / (food) can pass into the blood (stream) / (food) can be transported in the blood / (food) can pass through the wall of the intestine / so diffusion possible (1)</p>	<p>1</p>	<p>ignore references to body</p> <p>not through cell wall not just into the wall of the intestine ignore gut</p>
	<p>Total</p>	<p>9</p>	

Question		Expected Answers	Marks	Additional Guidance	
4	a	mayonnaise / salad cream / salad dressings / eggs / tomato ketchup / biscuits / breakfast cereal / cakes / deserts / mousses / soft drinks / toffee / chewing gum / ice cream / dried potato / chocolate coatings / bread / margarine / low fat spreads / coffee whiteners / topping powders / peanut butter / caramels / cheese / milk drinks / yoghurt / frankfurters / mortadella / luncheon meat / pate / butter (1)	1		
	b	to improve or help the flavour or taste (1)	1	allow bring out / strengthen flavour allow crisps have no flavour, added to enhance flavour allow flavour not very strong so MSG enhances it allow to taste nicer (lowest limit of acceptability) ignore it is a flavour enhancer but allow it enhances the flavour ignore to make food more interesting ignore just change the flavour or add flavour ignore references to digestion / appearance ignore to make more / different flavours	
	c	i	test- use limewater (1) turns cloudy or milky or chalky (1)	2	mark independent even if test is totally incorrect no e.c.f. ignore murky / grey / misty
		ii	$2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$ formulae correct on r.h.s. and l.h.s.(1) balancing (1)	2	allow correct multiples allow reversible arrow or equals sign balancing mark dependent on correct formulae not + heat in formula or heat on l.h.s. this answer scores 0 but allow heat above arrow
		Total	6		

Question		Expected Answers	Marks	Additional Guidance
5	a	fractionating column or fractionating tower (1)	1	allow fractional distillation column / tower but not just fractional column allow fractional distillator column or tower not furnace
	b	x inside column(to include exit tube) above top dotted lines (1) 	1	centre of cross must be on or above top dotted line
	c	larg(er) or long(er) molecules have high(er) boiling point (than smaller molecules) / ora (1) larg(er) molecules have larg(er) or more intermolecular forces / larger or more forces between molecules / ora (1)	2	allow larger they are the higher boiling point / ora (1) allow stronger IMF results in a higher boiling point (1) not intramolecular forces or forces within molecules allow bonds for 'forces' allow the larger they are the bigger the forces between them / ora ignore reference to energy
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
6	a	acid + alcohol (1) → ester + water (1)	2	
	b	(attraction or force between water molecules) is strong(er) (1) idea of force or attraction between water molecules and nail varnish is weak(er) (1)	2	read both response together before awarding marks but then mark each point independently but the force between water molecules is greater than the force between water particles and nail varnish particles scores (2)
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
7	a	<p>any two from idea of availability / is it easy to get hold of / how long will it last (1)</p> <p>idea of renewable (1)</p> <p>idea of flammability / how well it burns (1)</p> <p>idea of pollution products / does it produce harmful substances when burned / does it have a clean flame / is it smelly / AW (1)</p> <p>idea of storage (1)</p> <p>idea of toxicity of fuel (1)</p> <p>idea of ease of use (1)</p> <p>idea of safety</p>	2	<p>allow can it run out / is it nearby / global stocks / how much in reserves (1) ignore how much is needed ignore 'mass' on its own</p> <p>allow ease of burning / ease of ignition / explosive (1)</p> <p>ignore environmentally friendly / does it harm the environment allow idea of contribution to global warming (1)</p> <p>allow is it poisonous / must be non-poisonous / no harmful effects if in contact with people / will it irritate skin (1) allow harmful (1)</p> <p>allow is it easy to use / is it difficult to use / is it easy to light / is it a solid, liquid or gas (1)</p> <p>allow is it safe (1)</p> <p>ignore references to pay back time, efficiency or solar panels</p>
	b	<p>increased population / more demand for or consumption of energy / increased industry (1)</p>	1	<p>ignore just more demand or more demand for fuel allow idea of demand from emerging economies eg China is having an industrial revolution more countries are becoming developed allow more transport e.g. cars / more electrical (appliances) / more consumables / more technology ignore references to renewable energy</p>
		Total	3	

Question		Expected Answers	Marks	Additional Guidance
8	a	propane (1)	1	allow correct formula C ₃ H ₈ if answer line is blank allow correct answer ticked, circled or underlined not propene
	b	CH ₄ O (1)	1	allow CH ₃ OH / COH ₄ / H ₄ CO / OH ₄ C / H ₄ OC not CH ₃ OH / CH ³ OH not CH ₄ O / CH ⁴ O allow C ₁ H ₄ O ₁
	c		1	ignore brackets unless they put n after them bonds can be in any direction
		Total	3	

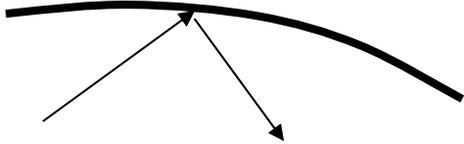
Question			Expected Answers	Marks	Additional Guidance
9	a	i	<p>any one from meal hotter or higher temperature than surroundings or environment / AW (1)</p> <p>idea of heat or energy lost / given out / radiated / convected / conducted (from meal to surroundings) / AW (1)</p>	1	<p>not just meal is hot(ter) must mention surroundings or environment</p> <p>allow ora</p> <p>allow falling / returning to room temperature or 20°C (1)</p> <p>ignore exothermic but not endothermic</p>
		ii	<p>any one from drink colder or lower temperature than surroundings or environment / AW (1)</p> <p>idea of heat or energy gained / absorbed / radiated / convected / conducted (from surroundings to drink) / AW (1)</p>	1	<p>not just drink is cold(er) must mention surroundings or environment</p> <p>allow ora</p> <p>allow rising / returning to room temperature or 20°C (1)</p> <p>ignore endothermic but not exothermic</p>
	b		<p>hotness (1)</p> <p>energy (1)</p>	2	must be in correct order
Total				4	

Question		Expected Answers	Marks	Additional Guidance
10	a	<p>any two from</p> <p>foam is a poor conductor / (good) insulator (1)</p> <p>foam contains air (bubbles) / air bubbles trapped (1)</p> <p>air or bubbles is poor conductor or (good) insulator (1)</p> <p>prevents or reduces convection (in cavity) (1)</p> <p>description of convection currents (1)</p> <p>idea of prevents or reduces or stops radiation or radiated heat (in the cavity) (1)</p>	2	<p>allow less conduction happens or conduction is more difficult (1)</p> <p>allow foam stops conduction (1)</p> <p>not air entering being trapped or warmed</p> <p>trapped air does not conduct (well) / insulates gains (2)</p> <p>allow stops convection / no (moving) air (particles) so no heat loss by convection (1)</p>
	b	<p>by conduction (brick) (1)</p> <p>by convection / radiation (1)</p>	2	<p>allow explanation in terms of energy passing form particle to particle (1)</p> <p>not heat particles</p> <p>ignore brick not a (good) insulator</p> <p>allow idea of hot(ter) air rises (in the gap / cavity) (1)</p> <p>allow convection or description of convection outside of outer brick (1)</p>
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
11	a	<p>any three from microwaves absorbed by water (or fat) molecules / particles (1)</p> <p>increases (kinetic) <u>energy</u> of water or fat particles / molecules (1)</p> <p>(water or fat) particles vibrate more or move more (quickly) / increased speed or increased amount of movement of (water or fat) particles (1)</p> <p>heat or energy conducted / conected to centre (of food) (1)</p>	3	<p>must have idea of water / fat molecules or particles, not just microwaves absorbed by water / fat not microwaves heat the water particles must be idea of absorbed / taken in ignore just particles or food particles ignore heating of particles or food particles</p> <p>not infrared (IR) absorbed but only penalise IR answers once eg IR absorbed by water particles✘ scores (0) eg IR absorbed by water particles✘ and the heat is conducted to the centre ✓ scores (1) eg IR gives food particles energy✓ which is conducted to the centre✓ scores (2) IR type of answers can only score maximum of 2 marks</p> <p>allow (microwaves) give water (or fat) particles <u>energy</u> (1) allow increased (kinetic) <u>energy</u> of particles (1)</p> <p>ignore water particles start to vibrate or begin to move</p> <p>if water or fat is not mentioned they can not get two marks for ideas of energy or speed or movement from 2nd and 3rd marking points</p> <p>allow description eg the particles (of water / fat / food) vibrate and pass on the (kinetic) energy (to other particles) / make other particles vibrate (1) heat moves in the liquid by the fluid flowing (1)</p>

Question		Expected Answers	Marks	Additional Guidance
11	b	(microwaves would have) greater (energy) AW(1)	1	allow more power or powerful ignore references to wavelength ignore stronger or intense not a change in speed (of microwaves) eg speed is greater so more energy scores (0)
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
12	a	0.075 (2) but if answer is incorrect $15 \div 200 \times 100$ (1)	2	allow 7.5% if % shown clearly 7.5 on its own scores (1) Ignore any units other than % on answer line e.g. 0.075J or 0.075N scores 2 but 0.075% scores (1)
	b	5 (2) but if answer is incorrect $150 \div 30$ (1)	2	
		Total	4	

Question			Expected Answers	Marks	Additional Guidance
13	a	i	(waves) reflected (1)	1	<p>ignore bounced but allow correct diagram eg bounces off the atmosphere like this</p>  <p>scores (1) do not credit reflection if incorrectly qualified eg satellite / clouds / aeroplanes / ozone layer ignore refraction but total internal reflection or TIR scores (1)</p>
		ii	ionosphere (1)	1	<p>check answers to a(i) and if no mark was gained in this section award reflection mark from a correct answer to (a)(ii) allow upper or outer region / upper or outer layer of (Earth's atmosphere) allow thermosphere</p>
	b		300 000 000 (m / s) (2) but if answer is incorrect 3 000 000 000 x 0.1(1)	2	allow 3×10^8 or 300×10^6 or other 'correct' standard form type of notation
			Total	4	
			Paper Total	60	

B622/01 Unit 1: Modules B2, C2 and P2 Foundation

Question		Expected Answers	Marks	Additional Guidance
1	a	<p>any two from (different) sizes (1) (different) ages (1) different sex (1) presence of mane (1)</p>	2	<p>allow different size ears / paws / etc but only once (1) allow there are cubs / some are adults (1) allow there is a male / some are female (1) ignore just fur but allow fur around the head or neck</p>
	b	predator (1)	1	allow correct answer underlined, circled or ticked if answer line is blank
	c	<p>Either eyes at front of head (1) to judge distance / size (1)</p> <p>or</p> <p>idea of camouflage (1) to avoid being seen (by prey) / AW (1)</p> <p>or</p> <p>sharp teeth / claws (1) to catch / kill prey (1)</p> <p>or</p> <p>built for speed / can run fast/ large size (1) to catch / bring down prey / AW (1)</p>	2	<p>for two marks, adaptation and explanation must match e.g. big legs to run and catch prey =1 but hide in trees to catch prey =0</p> <p>ignore fur to keep warm</p> <p>allow avoid being seen by predators (1)</p> <p>allow large claws (1) but not just claws if they say just claws allow the catch prey mark allow eat prey (1)</p> <p>allow powerful muscles / strong (1) ignore long legs</p> <p>ignore can run fast in second point e.g. built for speed so they can run fast (1)</p> <p>allow stay in group (1) to catch / hunt prey / protection(1)</p>
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
2		carbon dioxide (1) water (1) glucose / starch / sugar / carbohydrate (1) oxygen / (1)	4	allow correct formulae e.g. CO ₂ not O
Total			4	

Question		Expected Answers	Marks	Additional Guidance
3	a	dodo: extinct mammoth: extinct panda: endangered sabre-toothed tiger: extinct	2	all correct (2) 2 or 3 correct (1) allow yes = tick and no =x
	b	extinct = died out / no more left (1) endangered = not many left / in danger of dying out / in danger of going extinct (1)	2	allow no longer exist / no chance of getting species back (1) allow all gone (1) but ignore all gone away ignore no longer alive / no longer around allow starting dying out (1) ignore in danger unless qualified ignore decreasing numbers / population going down ignore they are dying / being killed
	c	pollution / specific example of pollution e.g. acid rain / loss of habitat / hunting (1)	1	allow competition for resources (1) allow people kill them / eat them (1) ignore humans take up more space unless qualified e.g. people need more space (0) but people need more space to build houses / farm (1)
Total			5	

Question		Expected Answers	Marks	Additional Guidance
4	a	not enough light or water or minerals (under the trees) / competition for light or water or minerals (1)	1	allow they need light / water / minerals allow competition for nutrients ignore competition for food allow can not photosynthesize (well) allow tree roots are getting in the way allow no sunlight / in the shade ignore no sun
	b	i final answer = 240 (2) but 8 x 30 or 0.8 x 300 or 4 x as many dark moths (1)	2	correct answer with no working scores (2)
		ii idea of (better) camouflaged / idea of better adapted / idea of not much pollution / trees covered in lichen (1)	1	assume unqualified answer refers to pale moths allow they blend in / the predators can't see them / more disguised (1) ignore hidden allow pale is caused by a dominant allele or gene / pale moths are more hardy / less predation on pale moths (1) ignore the pale moths are not eaten allow less pale moths are eaten (1) allow reverse argument allow trees are not sooty / are pale (1) ignore leaves are pale
		iii breed them together (1) but fertile offspring (2)	2	allow they can reproduce together (1) allow they produce fertile offspring = 2 marks allow compare their DNA (1)
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
5	a	calcium carbonate (1)	1	ignore formula
	b	brick / cement / concrete / glass / aluminium / iron / steel / granite / wood / plastic / named plastic / sand / slate (1)	1	allow clay / ice / lead / metal / stone / straw / breeze blocks / plaster board / MDF allow suitable named metal e.g. not sodium
	c	i	1	carbon dioxide / CO ₂ (1)
		ii	1	allow a reaction which produces two or more substances from one substance (by heating) allow decomposes (with heat) / break up (with heat) not heat particles broken down ignore decay / dissolve
	d	clay (1)	1	allow correct answer underlined, circled or ticked if answer line is blank
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
6	a	nitrogen (1)	1	allow N ₂
	b	acid rain made (1) then any two from kills plants (1) kills fish / makes lakes acidic (1) attacks stonework / corrodes metals / corrodes statues (1) asthma / breathing problems in humans(1)	3	not global warming / ref to ozone e.g. causes acid rain and global warming (0) maximum of two marks if they mention global warming and or ozone e.g. acid rain kills fish and plant (3) e.g. acid rain causes global warming which kills fish and plants (2) e.g. global warming kills fish and plants (2) allow harms / damages plants (1) ignore affects plants / poisons plants allow kills aquatic life (1) but not marine life allow harms / damages fish (1) ignore poisons fish ignore affects fish ignore kills animals allow erodes building / attacks buildings (1) allow erodes statues (1) but ignore erodes metal statues ignore rust / erodes metals ignore just human health issues
	c	catalytic converter (1)	1	ignore catalyst
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
7	a	protection / decoration (1)	1	allow so it stands out / looks nice allow to make it colourful ignore to renew colour / replace old paint if its flaking
	b	solvent (1)	1	allow correct answer underlined, circled or ticked if answer line is blank
	c	warning of hot cup / (electric) kettles / pans / thermometer (on someone's head) / baby baths / battery testing / T-shirts that change colour / mood rings / beer cans (1)	1	allow temperature of babies' baths or food spoons allow novelty mugs / wallpaper / radiators allow to show if something is hot or cold ignore references to cooker hobs
		Total	3	

Question		Expected Answers	Marks	Additional Guidance	
8	a	calcium carbonate + hydrochloric acid → calcium chloride + carbon dioxide + water (1)	1	allow correct formulae or mix of correct formulae + words $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$ ignore balancing in symbol equation allow = instead of → not and / & instead of +	
	b	i	0.4 (g) (1)	1	
		ii	180-200 (seconds) (1)	1	
	c	<u>acid</u> runs out or used up (1)	1	allow acid is neutralised not acid is removed / soaked up not both run out not run out of reactant(s)	
	d	more surface area / more collisions (1)	1	allow more surface / more area allow more successful / frequent collisions but not faster collisions ignore particles closer together / have more energy / move faster	
		Total	5		

Question		Expected Answers	Marks	Additional Guidance
9	a	CaCO ₃ (1)	1	allow CaCO3 / calcium carbonate
	b	ZnSO ₄ (1)	1	allow ZnSO4 / zinc sulfate
		Total	2	

Question		Expected Answers	Marks	Additional Guidance
10		asteroid - a rock in space black hole - light cannot escape from it comet - has a tail made of water vapour and debris photocell - transfers light into electricity Sun - transfers energy to Earth as light and heat	4	ignore the Earth line all correct = 4 3 or 4 correct =3 2 correct =2 1 correct =1 more than one line from any box negates that mark
		Total	4	

Question			Expected Answers	Marks	Additional Guidance
11	a	i	oil / gas / coal	1	allow natural gas / north sea gas / peat not biogas / biofuel not petrol / diesel / crude oil / uranium
		ii	straw / wood / manure (1)	1	allow (household) rubbish allow biomass / biogas ignore alcohol
	b	i	change / increase / decrease voltage (1)	1	allow make the voltage safe allow change / increase / decrease current allow step up / step down voltage or current not control voltage or current not changes amount electricity / energy ignore transforms voltage or current
		ii	homes / factories / buildings (1)	1	allow power stations / people / household / schools / shops / any named building ignore electrical equipment e.g. light bulbs
		iii	(National) grid / power lines / wires / cables (1)	1	ignore just pylons allow pylon wires allow overhead line ignore grid lines but allow National grid lines not fibre optics
Total				5	

Question		Expected Answers	Marks	Additional Guidance
12	a	<p>any two from (tele)communications - TV / mobile (1)</p> <p>idea of weather monitoring (1)</p> <p>idea of spying (1)</p> <p>idea of military (1)</p> <p>SATNAV / AW (1)</p> <p>space telescope / space observation (1)</p> <p>earth observation (1)</p>	2	<p>maximum of 1 mark for (tele)communications answers allow Sky TV but not just sky (1) allow phones (1) allow signals but ignore carry signals</p> <p>ignore just weather</p> <p>allow tracking / to track things (1)</p> <p>allow to see what is out there / to see objects that might hit the Earth (1)</p> <p>allow described observations e.g. mapping / photography (1) allow Google Earth (1)</p>
	b	<p>oxygen (1)</p> <p>food (1)</p> <p>water / drink / liquids (1)</p>	3	<p>allow suitable atmospheres / air as alternative to oxygen (1) not carbon dioxide</p> <p>ignore clothes ignore shielding from UV rays / radiation cosmic rays</p>
		Total	5	

Question			Expected Answers	Marks	Additional Guidance
13	a	i	smoke detectors (1)	1	allow smoke alarms ignore fire alarms / cancer treatment not (paper) thickness testing
		ii	idea of tracers / paper thickness testing (1)	1	allow thin aluminium (foil) thickness testing allow control paper thickness allow find damaged tissue / organs in the body allow testing thickness of polymers ignore metal (foil) thickness testing / paper mills ignore cancer treatment ignore detecting cracks in pipes ignore checking quality of aluminium foil
		iii	non-Destructive-Testing / NDT / sterilising equipment / food irradiation / tracers (1)	1	allow testing for cracks in pipes or turbine blades etc allow cancer detection / gamma camera / bone scans / checking lorries for illegal immigrants or contraband allow monitoring liquid levels (in bottling plants) allow kill bacteria / microbes / other named micro-organisms ignore cancer treatment / kill cells
	b		(named) rocks / soil / living things / cosmic rays / AW (1)	1	allow radon / nuclear testing / medical sources / (named) food / nuclear power plants / nuclear waste / nuclear bombs / nuclear power stations ignore sun / solar flares / hospitals / X-rays / left over from the big bang / uranium / plutonium / space / light bulbs not mobile phones / microwave ovens

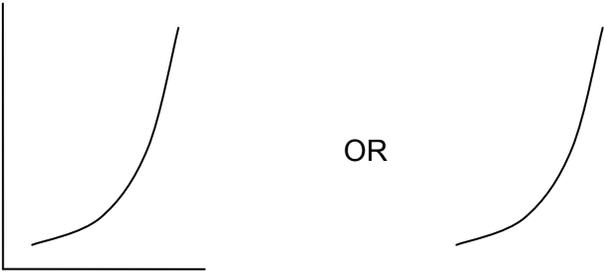
Question			Expected Answers	Marks	Additional Guidance
	c	i	(waste) product / by-product / AW (1)	1	allow the uranium decays / uranium turns into plutonium / ignore fast breeder reactor / reaction / uranium reacts / uranium has been split not any reference to uranium burning
		ii	nuclear weapons / AW (1)	1	allow pacemakers allow in reactors / to make electricity / nuclear fuel / powering submarines / to heat water in a power station allow nuclear warheads / nuclear explosions ignore just bombs / dirty bombs / energy source
			Total	6	
			Paper Total	60	

B622/02 Unit 2: Modules B2, C2 and P2 Higher

Question		Expected Answers	Marks	Additional Guidance
1	a	not enough light or water or minerals (under the trees) / competition for light or water or minerals (1)	1	allow they need light / water / minerals allow competition for nutrients ignore competition for food allow can not photosynthesize (well) allow tree roots are getting in the way allow no sunlight / in the shade ignore no sun
	b	i final answer = 240 (2) but 8 x 30 or 0.8 x 300 or 4 x as many dark moths (1)	2	correct answer with no working scores (2)
		ii idea of (better) camouflaged / idea of better adapted / idea of not much pollution / trees covered in lichen (1)	1	assume unqualified answer refers to pale moths allow they blend in / the predators can't see them / more disguised ignore hidden allow pale is caused by a dominant allele or gene / pale moths are more hardy / less predation on pale moths ignore the pale moths are not eaten allow less pale moths are eaten allow reverse argument allow trees are not sooty / are pale ignore leaves are pale
		iii breed them together (1) but fertile offspring (2)	2	allow they can reproduce together (1) allow they produce fertile offspring = (2) marks allow compare their DNA (1)
		Total	6	

Question			Expected Answers	Marks	Additional Guidance
2	a	i	(it had) feathers (1)	1	ignore wing unless qualify with feathers ignore vertebrate not invertebrate
		ii	(it had) scales (1)	1	ignore beak / claws / cold blooded / flying allow scaly skin
	b		<p>1. idea that there is variation in feathers and/or scales / AW (1)</p> <p>2. idea of advantage of feathers (1)</p> <p>3. idea that feathers are controlled genetically / can be passed to offspring / feather gene passed on (1)</p>	3	<p>e.g. some have more feathers than scales / some could have had feathers (1) allow mutation of genes for feathers or scales</p> <p>e.g. able to fly away from predators / those with more feather-like scales better able to survive / better able to keep warm (1) ignore just they can escape from predators / they have adapted to escape predators</p> <p>e.g. the gene for feathers is passed on (1) ignore reduces the gene pool</p> <p>max 1 for general answers that don't refer to feathers or flying e.g. 1. develop different adaptations to their environment 2. the ones best suited to the environment survive 3. most successful genes get passed on scores 1 mark</p>
Total				5	

Question		Expected Answers	Marks	Additional Guidance
3	a	<p>any two from rounded shape to reduce water loss or transpiration (1) spines / no leaves to reduce water loss or transpiration (1) small surface area (to volume ratio) to reduce water loss or transpiration (1) leaves reduced to spines for small surface area (to volume ratio) (1)</p> <p>idea of swollen stem to store water (1)</p> <p>idea of deep roots to absorb (more) water (1)</p> <p>idea of roots near surface or widespread roots which cover a wide area to absorb (surface) water (quickly / before it evaporates) (1)</p> <p>green stem for photosynthesis (1)</p>	2	<p>e.g. rounded shape gives small surface area to reduce water loss scores (2) ignore spines to prevent animals eating them</p> <p>allow (stem is) corrugated or fluted to expand when water is taken in (1)</p> <p>e.g. long / deep roots to collect more water (1)</p> <p>e.g. wide spread roots to absorb more water (1) ignore references to roots to collect nutrients</p> <p>allow reference to fewer stomata / stomata in pits / stomata closed during the day (1)</p>
	b	<p>carbon dioxide (1) water (1) oxygen (1)</p>	3	<p>carbon dioxide and water on left hand side - order does not matter allow correct formulae; ignore balancing ignore '+ energy'</p>
	c	<p>glucose (1)</p>	1	<p>allow oil / fat / lipid allow (named) carbohydrate e.g. starch / cellulose not glucose and water / glucose and oxygen / glucose and carbon dioxide / carbon dioxide and water</p>
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
4	a	increase at an ever increasing rate / growth or gradient of curve is getting steeper (1)	1	<p>ignore is increasing rapidly / it keeps on increasing allow it doubles every time / increases by a fixed percentage every time allow a sketch graph which shows exponential growth</p> 
	b	<p>need renewable energy sources / wind / tidal / solar / wave / hydro-electric / geothermal / biomass (1)</p> <p>so don't use up finite resources / do not cause pollution (1)</p>	2	<p>allow use / cut down / burn wood for (1) mark allow use wood and re-plant trees for (2) marks marks for wood or biomass – can only gain second mark for mention of re-planting</p> <p>e.g. use renewable energy so less fossil fuels used scores 2 ignore vague answers e.g. wave energy is cleaner scores 1; tidal energy is environmentally friendly scores 1 ignore can be used again</p>
		Total	3	

Question		Expected Answers	Marks	Additional Guidance
5	a	break down (of a substance)(using heat) (1)	1	allow a reaction which produces two or more substances from one substance (by heating) allow decomposes (with heat) / break up (with heat) not heat particles broken down ignore decay /dissolve
	b	clay (1)	1	allow correct answer underlined, circled or ticked if answer line blank
	c	$\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ (1)	1	allow = instead of \rightarrow allow correct multiples not $\text{CaCO}_3 + \text{heat} \rightarrow \text{CaO} + \text{CO}_2$ allow heat above arrow formulae must be correct, i.e. not CO_2 / CO^2 / CACO_3
	d	i (marble is a) metamorphic rock (1)	1	
		ii (limestone is a) sedimentary rock (1)	1	
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
6	a	20 - 21 (%) (1)	1	
	b	burning (named) (fossil) fuels (1)	1	allow volcanic eruptions / from volcanoes / from hot springs allow car fumes, but not just cars allow power stations allow factory fumes or factory smoke but not just factories ignore combustion / burning unless correctly qualified
	c	carbon dioxide (1)	1	allow CO ₂ ignore carbon oxide not CO ₂ or CO ²
		Total	3	

Question		Expected Answers	Marks	Additional Guidance
7	a	(water) evaporates (1)	1	allow solvent evaporates allow it evaporates not fumes evaporates
	b	warning of hot cup / (electric) kettles / pans / thermometer (on someone's head) / baby baths / battery testing / T-shirts that change colour / mood rings / beer cans (1)	1	allow temperature of babies' baths or food spoons allow novelty mugs / wallpaper / radiators allow to show if something is hot or cold ignore references to cooker hobs
	c	Box 1 - solid particles are mixed with particles of a liquid but not dissolved (1) Box 3 - the solid particles will not separate out because they are very small and do not sink to the bottom (1) ie <div style="display: flex; flex-direction: column; align-items: center; gap: 10px;"> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div>	2	if more than two boxes ticked – deduct one mark for each additional tick
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
8	a	calcium carbonate + hydrochloric acid → calcium chloride + carbon dioxide + water (1)	1	allow correct formulae or mix of correct formulae + words $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$ ignore balancing in symbol equation allow = instead of → not and / & instead of +
	b	180-200 (seconds) (1)	1	
	c	more (surface) area (1) more frequent collisions / more collisions per second / more chance of a collision (1)	2	allow more surface (1) ignore particles closer together / more crowded ignore particles have more energy not faster / quicker collisions allow 1 mark for more (successful) collisions if no other mark awarded
	d	more crowded particles / more particles in the same volume / particles more compact / AW (1) more frequent collisions / more collisions per second / more chance of a collision (1)	2	not just 'more particles' not faster / quicker collisions allow 1 mark for more (successful) collisions if no other mark awarded
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
9	a	oxidation (1)	1	allow correct answer underlined, circled or ticked if answer line is blank multiple answers = 0
	b	aluminium has a protective layer (of aluminium oxide) (1)	1	allow aluminium has an impervious layer / AW allow covered in aluminium oxide allow waterproof outer shell (limit of acceptability)
		Total	2	

Question			Expected Answers	Marks	Additional Guidance
10	a	i	smoke detectors (1)	1	allow smoke alarms ignore fire alarms / cancer treatment not (paper) thickness testing
		ii	idea of tracers / paper thickness testing (1)	1	allow thin aluminium (foil) thickness testing allow control paper thickness allow find damaged tissue / organs in the body allow testing thickness of polymers ignore metal (foil) thickness testing / paper mills ignore cancer treatment ignore detecting cracks in pipes ignore checking quality of aluminium foil
		iii	non-Destructive-Testing / NDT / sterilising equipment / food irradiation / tracers (1)	1	allow testing for cracks in pipes or turbine blades etc allow cancer detection / gamma camera / bone scans / checking lorries for illegal immigrants or contraband allow monitoring liquid levels (in bottling plants) allow kill bacteria / microbes / other named micro-organisms ignore cancer treatment / kill cells
	b		(named) rocks / soil / living things / cosmic rays / AW (1)	1	allow radon / nuclear testing / medical sources / (named) food / nuclear power plants / nuclear waste / nuclear bombs / nuclear power stations ignore sun / solar flares / hospitals / X-rays / left over from the big bang / uranium / plutonium / space / light bulbs not mobile phones / microwave ovens
	c	i	(waste) product / by-product / AW (1)	1	allow the uranium decays / uranium turns into plutonium / ignore fast breeder reactor / reaction / uranium reacts / uranium has been split not any reference to uranium burning
		ii	nuclear weapons / AW (1)	1	allow pacemakers allow in reactors / to make electricity / nuclear fuel / powering submarines / to heat water in a power station allow nuclear warheads / nuclear explosions ignore just bombs / dirty bombs / energy source
			Total	6	

Question		Expected Answers	Marks	Additional Guidance
12	a	1st answer : coal burns (1) 2nd answer : steam produced > turbine spins > turbine drives the generator (1)	2	allow arrows from stages to correct boxes must all be in the correct order
	b	600 000 (joules) (2)	2	either useful electrical output 350 000 J or 650 000 (joules) or addition of incorrect output and losses subtracted from 1 million scores (1)
	c	reduced current (1) less heating (in the cables) (1)	2	ignore more efficient / less waste / less expensive ignore less energy loss / no heat loss allow higher level answers in terms of I^2R losses
		Total	6	

Question			Expected Answers	Marks	Additional Guidance
13	a	i	between Mars and Jupiter (1)	1	allow correct answer underlined, circled or ticked if answer line is blank more than one answer scores 0
		ii	craters / layers of unusual elements in rocks / sudden changes in fossil numbers (1)	1	allow (in the past) dust in atmosphere / climate change / species extinction (1) ignore dents / holes allow remains of asteroids on Earth's surface
	b	i	ice (and dust / organic material / carbon dioxide) (1)	1	ignore rock but allow ice and rock / icy rock ignore frozen gases
		ii	increased gravity / AW (1)	1	allow larger (accelerating) force (1)
			Total	4	
			Paper Total	60	

Grade Thresholds

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

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B621/01	Raw	60	-	-	-	31	25	19	13	7	0
	UMS	69	-	-	-	60	50	40	30	20	0
B621/02	Raw	60	46	37	28	19	13	10	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B622/01	Raw	60	-	-	-	35	29	23	17	11	0
	UMS	69	-	-	-	60	50	40	30	20	0
B622/02	Raw	60	47	39	31	23	15	11	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B625/01	Raw	60	55	51	46	42	37	32	27	22	0
	UMS	100	90	80	70	60	50	40	30	20	0

B625 - The grade thresholds have been decided on the basis of the work that was presented for award in June 2009. The threshold marks will not necessarily be the same in subsequent awards.

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
J640	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
J640	4.2	15.6	35.4	63.0	79.2	90.0	96.1	98.7	100.0	78945

80042 candidates were entered for aggregation this series

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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