OCR
RECOGNISING ACHIEVEMENT

GCSE

Science B J640

Gateway Science Suite

General Certificate of Secondary Education

Mark Scheme for the Units

June 2009

J640/MS/R/09

Oxford Cambridge and RSA Examinations

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GCSE Gateway Science B J640

MARK SCHEMES FOR THE UNITS

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

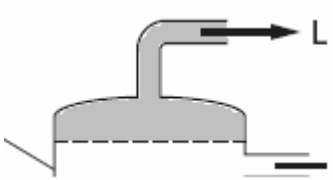
Question			Expected Answers	Marks	Additional Guidance
1	a		nucleus (1)	1	
	b		DNA (1)	1	**allow** dna / deoxyribonucleic acid / nucleic acid
	c		sexual reproduction / fertilisation (1)	1	**ignore** reproduction **ignore** conception **ignore** sexual intercourse
			Total	**3**	

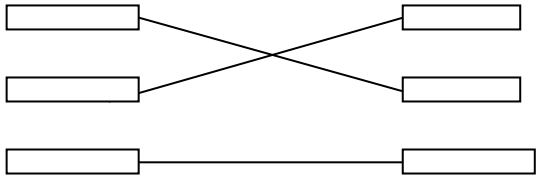
Question			Expected Answers	Marks	Additional Guidance
2	a		**any two from** fast / AW (1) automatic / predictable / does not involve conscious thought / AW (1) protective / AW (1)	2	 **allow** does not think about it **allow** she has no control **allow** she cannot stop her pupils from doing it **allow** happens unconsciously **ignore** does not involve the brain
	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		all 3 points correctly plotted (2) **but** 2 correctly plotted (1) smooth line through all points (1)	3	**allow** +/- half a square 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
	b		**any three from** heart beats faster / muscles need more blood / increased blood flow (1) get **more** oxygen / get oxygen more quickly (1) get **more** glucose / get glucose more quickly (1) remove **more** carbon dioxide / remove carbon dioxide more quickly (1) to / from muscles (1) for more energy / respiration (1)	3	**ignore** heart pumps more blood **allow** reverse argument e.g heart was not beating fast enough so not enough oxygen (2) **only allow** muscles mark once, but must be in correct context
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
4	a	i	heat stroke / dehydration / death (1)	1	**allow** higher level answers e.g. damage to enzymes or stops enzymes working or denatures enzymes or affect the way enzymes work **ignore** kills enzymes **allow** heat exhaustion or fainting or dizziness or headache **allow** idea of damage to (named) cells e.g. kills cells **ignore** burn or body becomes too hot or overheats **ignore** just 'stroke' **ignore** damage to any body part e.g. brain
		ii	(heat needed for) evaporation (1)	1	**allow** correct description of evaporation process **allow** higher level references to taking latent heat from the body **not** evaporation of heat **ignore** references to pores releasing water (onto skin)
		iii	maintaining a constant internal environment / balancing bodily inputs and outputs / control of internal environment (1)	1	**allow** maintain optimum status in the body **allow** examples of controlling or maintaining e.g. temperature, (blood) sugar level, carbon dioxide, water level, pH **allow** 'keeping the temperature the same' (as lowest level of acceptability **ignore** 'drops (body) temperature' unless qualified by returning to normal
	b		aspirin (1)	1	**allow** correct answer underlined, circled or ticked if answer line is blank
	c		(no - no mark) antibiotics (only) work against bacteria / fungi (1)	1	**allow** antibiotics do not work against viruses or have no effect on viruses or cannot kill or fight off viruses **ignore** simply antibiotics do not work **ignore** references to antibodies and white blood cells **ignore** virus cannot be killed by drugs **allow** (yes - no mark) to prevent secondary infection
	d		antigen (1)	1	**allow** correct answer underlined, circled or ticked if answer line is blank
			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		**any two from** idea of availability / is it easy to get hold of / how long will it last (1) idea of renewable (1) idea of flammability / how well it burns (1) idea of pollution products / does it produce harmful substances when burned / does it have a clean flame / is it smelly / AW (1) idea of storage (1) idea of toxicity of fuel (1) idea of ease of use (1) idea of safety	2	**allow** can it run out / is it nearby / global stocks / how much in reserves **ignore** how much is needed **ignore** 'mass' on its own **allow** ease of burning / ease of ignition / explosive **ignore** environmentally friendly / does it harm the environment **allow** idea of contribution to global warming **allow** is it poisonous / must be non-poisonous / no harmful effects if in contact with people / will it irritate skin **allow** harmful **allow** is it easy to use / is it difficult to use ***/*** is it easy to light / is it a solid, liquid or gas **allow** is it safe **ignore** references to pay back time, efficiency or solar panels
	b		carbon dioxide / CO_2 (1)	1	**not** CO2 or CO^2 or Co_2 **not** carbon dioxide + heat
	c		carbon monoxide /CO / poisonous gas formed (1)	1	**allow** harmful / dangerous gas made **allow** less heat is produced
			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_3H_8
	c		propane (1)	1	**allow** C_3H_8
	d		CH_4O (1)	1	**allow** CH_3OH / COH_4 / H_4CO / OH_4C / H_4OC **not** CH3OH / CH^3OH **not** CH4O / CH^4O **allow** $C_1H_4O_1$
			Total	**4**	

Question			Expected Answers		Marks	Additional Guidance
10	a		**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
	b		joules (1)		1	**allow** J / kilojoules / calories / cal / kcal
			Total		**4**	

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

Question			Expected Answers	Marks	Additional Guidance
12	a		water (1)	1	**allow** moisture / H_2O / 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	remote controls / motion or position sensors / (burglar) alarms / security lights (1)	1	**allow** temperature / thermal sensing **allow** mobile phones **allow** physiotherapy **ignore** just optical fibres **ignore** telephones, communication
		ii	analogue (1)	1	**allow** correct diagram of an analogue wave e.g. 
			Total	**5**	

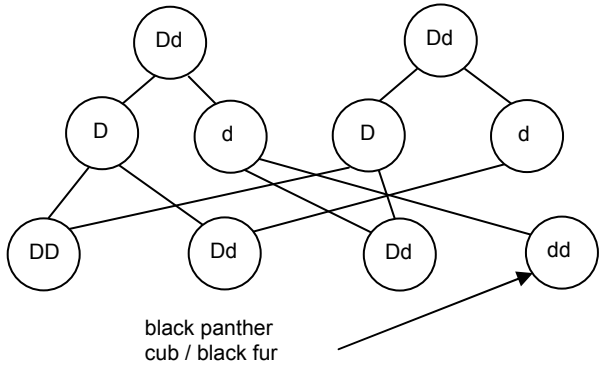
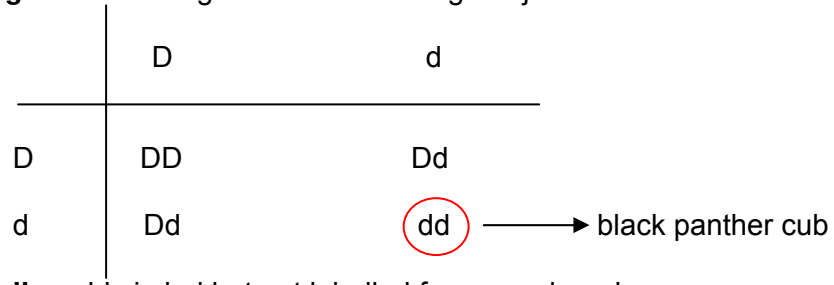
Question			Expected Answers	Marks	Additional Guidance
13	a		B **and** C (1)	1	both needed (any order) **allow** B **and** C ringed, underlined or ticked if answer line blank **allow** close curtains at night **and** insulation in the loft written on the answer line
	b		0.075 (2) **but if answer is incorrect** 15÷200 (x 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		× ✓ (✓) (✓) ✓	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 x 0.1(1)	2	**allow** 3 x 10^{8} or 300 x 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**	

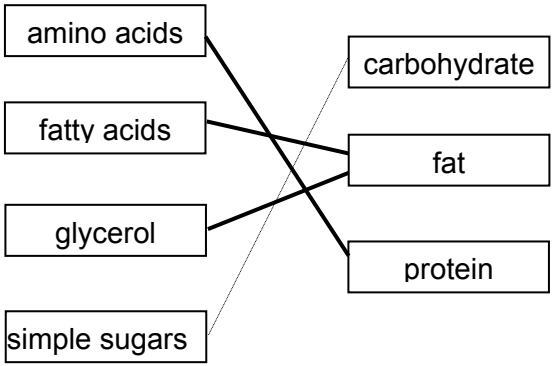
			Paper Total	**60**	

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

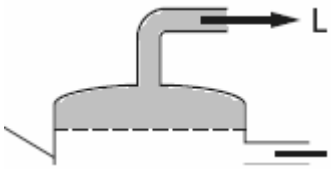
Question			Expected Answers	Marks	Additional Guidance
1	a	i	heat stroke / dehydration / death (1)	1	**allow** higher level answers e.g. damage to enzymes or stops enzymes working or denatures enzymes or affect the way enzymes work **ignore** kills enzymes **allow** heat exhaustion or fainting or dizziness or headache **allow** idea of damage to (named) cells e.g. kills cells **ignore** burn or body becomes too hot or overheats **ignore** just 'stroke' **ignore** damage to any body part e.g. brain
		ii	(heat needed for) evaporation (1)	1	**allow** correct description of evaporation process **allow** higher level references to taking latent heat from the body **not** evaporation of heat **ignore** references to pores releasing water (onto skin)
		iii	maintaining a constant internal environment / balancing bodily inputs and outputs / control of internal environment (1)	1	**allow** maintain optimum status in the body **allow** examples of controlling or maintaining e.g. temperature, (blood) sugar level, carbon dioxide, water level, pH **allow** 'keeping the temperature the same' (as lowest level of acceptability **ignore** 'drops (body) temperature' unless qualified by returning to normal
	b		aspirin (1)	1	**allow** correct answer underlined, circled or ticked if answer line is blank
	c		(no - no mark) antibiotics (only) work against bacteria / fungi (1)	1	**allow** antibiotics do not work against viruses or have no effect on viruses or cannot kill or fight off viruses **ignore** references to antibodies and white blood cells **ignore** virus cannot be killed by drugs **allow** (yes - no mark) to prevent secondary infection
	d		antigen (1)	1	**allow** correct answer underlined, circled or ticked if answer line is blank
			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  **middle stage** not essential in diagram if 1st and 3rd stages correct **ignore** matching lines in above diagram just look for correct letters  **allow** dd circled but not labelled for second mark
			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	relaxes (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) oxygen debt (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

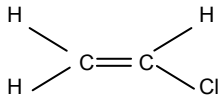
Question			Expected Answers	Marks	Additional Guidance
	c	i	line from amino acids to protein (1) lines from fatty acids **and** glycerol to fat (1)  	2	 **both** needed if more than 3 lines drawn deduct one mark for each extra line to a minimum of zero
		ii	(food) can be absorbed / (food) can pass into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

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	$2NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$ 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 distilator 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		**any two from** idea of availability / is it easy to get hold of / how long will it last (1) idea of renewable (1) idea of flammability / how well it burns (1) idea of pollution products / does it produce harmful substances when burned / does it have a clean flame / is it smelly / AW (1) idea of storage (1) idea of toxicity of fuel (1) idea of ease of use (1) idea of safety	2	**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 **allow** ease of burning / ease of ignition / explosive (1) **ignore** environmentally friendly / does it harm the environment **allow** idea of contribution to global warming (1) **allow** is it poisonous / must be non-poisonous / no harmful effects if in contact with people / will it irritate skin (1) **allow** harmful (1) **allow** is it easy to use / is it difficult to use / is it easy to light / is it a solid, liquid or gas (1) **allow** is it safe (1) **ignore** references to pay back time, efficiency or solar panels
	b		increased population / more demand for or consumption of energy / increased industry (1)	1	**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
			Total	**3**	

Question			Expected Answers	Marks	Additional Guidance
8	a		propane (1)	1	**allow** correct formula C_3H_8 if answer line is blank **allow** correct answer ticked, circled or underlined **not** propene
	b		CH_4O (1)	1	**allow** CH_3OH / COH_4 / H_4CO / OH_4C / H_4OC **not** CH3OH / CH^3OH **not** CH4O / CH^4O **allow** $C_1H_4O_1$
	c			1	**ignore** brackets unless they put n **after** them bonds can be in any direction
			Total	**3**	

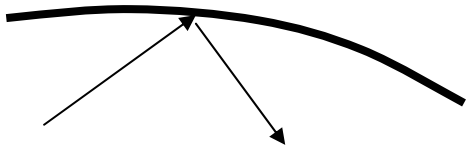
Question			Expected Answers	Marks	Additional Guidance
9	a	i	**any one from** meal hotter or higher temperature than surroundings or environment / AW (1) idea of heat or energy lost / given out / radiated / convected / conducted (from meal to surroundings) / AW (1)	1	**not** just meal is hot(ter) must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

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

Question			Expected Answers	Marks	Additional Guidance
11	a		**any three from** microwaves absorbed by water (**or** fat) molecules / particles (1) increases (kinetic) <u>energy</u> of water or fat particles / molecules (1) (water or fat) particles vibrate **more** or move **more** (quickly) / increased speed or increased amount of movement of (water or fat) particles (1) heat or energy conducted / convected to centre (of food) (1)	3	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 **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** **allow** (microwaves) give water (or fat) particles <u>energy</u> (1) **allow** increased (kinetic) <u>energy</u> of particles (1) **ignore** water particles start to vibrate or begin to move **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** **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)

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÷200 (x 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÷30 (1)	2	
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
13	a	i	(waves) reflected (1)	1	**ignore** bounced but **allow** correct diagram eg bounces off the atmosphere like this  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)
		ii	ionosphere (1)	1	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
	b		300 000 000 (m / s) (2) **but if answer is incorrect** 3 000 000 000 x 0.1(1)	2	**allow** 3 x 10^{8} or 300 x 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		**any two from** (different) sizes (1) (different) ages (1) different sex (1) presence of mane (1)	2	**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
	b		predator (1)	1	**allow** correct answer underlined, circled or ticked if answer line is blank
	c		**Either** eyes at front of head (1) to judge distance / size (1) **or** idea of camouflage (1) to avoid being seen (by prey) / AW (1) **or** sharp teeth / claws (1) to catch / kill prey (1) **or** built for speed /can run fast/ large size (1) to catch / bring down prey / AW (1)	2	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 **ignore** fur to keep warm **allow** avoid being seen by predators (1) **allow** large claws (1) **but** not just claws if they say just claws allow the catch prey mark **allow** eat prey (1) **allow** powerful muscles / strong (1) ignore long legs **ignore** can run fast in second point e.g. built for speed so they can run fast (1) **allow** stay in group (1) to catch / hunt prey / protection(1)
			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	carbon dioxide / CO_2 (1)	1	
		ii	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
	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 $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$ **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		acid 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		**any two from** (tele)communications - TV / mobile (1) idea of weather monitoring (1) idea of spying (1) idea of military (1) SATNAV / AW (1) space telescope / space observation (1) earth observation (1)	2	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 **ignore** just weather **allow** tracking / to track things (1) **allow** to see what is out there / to see objects that might hit the Earth (1) **allow** described observations e.g. mapping / photography (1) **allow** Google Earth (1)
	b		oxygen (1) food (1) water / drink / liquids (1)	3	**allow** suitable atmospheres / air as alternative to oxygen (1) **not** carbon dioxide **ignore** clothes **ignore** shielding from UV rays / radiation cosmic rays
			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**	

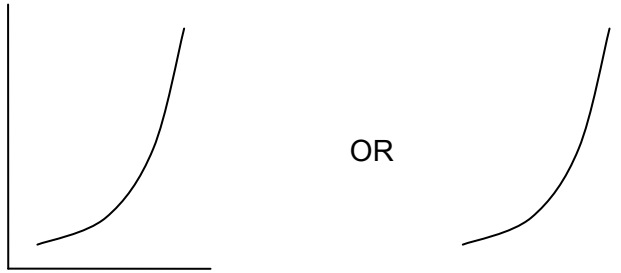
			Paper Total	**60**	

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		1. idea that there is variation in feathers and/or scales / AW (1) 2. idea of advantage of feathers (1) 3. idea that feathers are controlled genetically / can be passed to offspring / feather gene passed on (1)	3	e.g. some have more feathers than scales / some could have had feathers (1) **allow** mutation of **genes** for feathers or scales 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 e.g. the gene for feathers is passed on (1) **ignore** reduces the gene pool **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
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
3	a		**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) idea of swollen stem to store water (1) idea of deep roots to absorb (more) water (1) idea of roots near surface or widespread roots which cover a wide area to absorb (surface) water (quickly / before it evaporates) (1) green stem for photosynthesis (1)	2	e.g. rounded shape gives small surface area to reduce water loss scores (2) **ignore** spines to prevent animals eating them **allow** (stem is) corrugated or fluted to expand when water is taken in (1) e.g. long / deep roots to collect more water (1) e.g. wide spread roots to absorb more water (1) **ignore** references to roots to collect nutrients **allow** reference to fewer stomata / stomata in pits / stomata closed during the day (1)
	b		carbon dioxide (1) water (1) oxygen (1)	3	carbon dioxide and water on left hand side - order does not matter **allow** correct formulae; **ignore** balancing **ignore** '+ energy'
	c		glucose (1)	1	**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
			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	**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  OR
	b		need renewable energy sources / wind / tidal / solar / wave / hydro-electric / geothermal / biomass (1) so don't use up finite resources / do not cause pollution (1)	2	**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 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
			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		$CaCO_3 \rightarrow CaO + CO_2$ (1)	1	**allow** = instead of $\rightarrow$ **allow** correct multiples **not** $CaCO_3$ + heat $\rightarrow$ $CaO + CO_2$ **allow** heat above arrow formulae must be correct, i.e. **not** CO2 / 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 CO2 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 ☑ ☐ ☑ ☐	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 $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$ **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
11	a		**any two from** glass transparent to Sun's rays or radiation or light or sunlight or Sun's energy or IR / AW (1) surfaces inside conservatory **absorb** heat (1) surfaces in conservatory **emit** heat (1) glass reflects infrared (1)	2	**ignore** heat / just energy / UV **allow** Sun's rays enter or go through the conservatory **allow** Sun's rays go through the glass **ignore** references to IR bouncing off the glass **allow** higher level answers in terms of wavelength or frequency e.g. short wavelength passes through glass (1) longer wavelength reflected (1) e.g. high frequency passes through glass (1) low frequency reflected (1)
	b	i	**two required from** renewable / rugged / no polluting waste / no fuel needed (1)	1	**two correct answers** needed for (1) mark **allow** does not contribute to global warming **allow** it does not run out / sustainable **allow** wind energy is free / wind energy is cheap / no fuel costs **ignore** easy to use / eco-friendly / easy to maintain / cheap to run
		ii	**two required from** visual pollution / depends on wind speed / space needed / kills birds / idea that a lot of turbines needed to produce sufficient energy (1)	1	**two correct answers** needed for (1) mark **allow** weather dependent **ignore** unreliable unless qualified e.g. unreliable scores 0, but **allow** wind is unreliable scores 1 **ignore** expensive to set up **allow** 'noisy' **if** candidate has not gained marks for bi and bii check and if one correct advantage and one correct disadvantage award one mark
			Total	**4**	

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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