

Science B

General Certificate of Secondary Education

Unit **B621/01**: Unit 1 Modules B1, C1, P1 (Foundation Tier)

Mark Scheme for June 2012

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All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Subject-specific Marking Instructions

/	alternative and acceptable answers for the same marking point
(1)	separates marking points
allow	answers that can be accepted
not	answers which are not worthy of credit
reject	answers which are not worthy of credit
ignore	statements which are irrelevant
()	words which are not essential to gain credit
—	underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
ecf	error carried forward
AW	alternate wording
ora	or reverse argument

Question		Answer	Marks	Guidance	
1	(a)	correctly calculating any one average Tom =10(cm) or Peter=8(cm) or Mary=9(cm) (1)	3	names not needed in calculation	
		correctly calculating all averages : Tom =10(cm) and Peter = 8(cm) and Mary = 9(cm) (2) Peter (is fastest) (1)		names not needed in calculation if no mark awarded allow (1) for any attempt at calculating an average eg (Mary) $36 \div 5$ or 7.6 (1) or (Peter) $32 \div 5$ or 6.4	
	(b)	(i)	lens (1)	1	
		(ii)	retina (1)	1	allow receptor
	(c)		finger muscle(s) / hand muscle(s) (1)	1	allow muscle(s)
	(d)		reflexes are automatic / this response is conscious / AW (1)	1	allow because you are meaning to do it / it involves the brain
			Total	7	

Question			Answer	Marks	Guidance
2	(a)	(i)	fibre (1)	1	allow roughage
		(ii)	answer dependent on correct answer to 2a(i) no need to prevent constipation / constipation is not a problem (1)	1	allow digestive system not working properly yet / AW allow fibre only found in plants / not found in animals / not found in humans allow because your body does not make it allow not soluble / difficult to secrete allow babies lack teeth / cannot chew allow not required by the baby at this stage of development
	(b)	(i)	passive (1)	1	allow any indication of correct answer including the word passive written beside the answer if no word circled ticked or underlined more than one answer (0)
		(ii)	antibodies not made by baby / AW (1)	1	allow passed on from mother ignore passed on through milk
		(iii)	acid (1) in stomach (1) kills or destroys pathogens (1)	3	allow higher level answer: hydrochloric acid / HCl ignore break down allow kills or destroys bacteria ignore germs allow higher level answers correctly referring to gut flora / other bacteria not any reference to injections ignore any references to the immune system eg white blood cells
	(c)		37(°C) (1)	1	allow answer in range 35-37 (°C)
Total				8	

Question		Answer	Marks	Guidance
3	(a)	cannot give it up (easily) / dependent on it / have withdrawal symptoms if try to give up / AW (1)	1	allow correct description of a withdrawal symptom: craving / anxiety / stress
	(b)	(i)	increase (1)	1 allow decrease (1)
		(ii)	correct explanation related to answer in b(i) increase-: to get enough oxygen around the body / AW (1)	1 allow decrease- heart needs oxygen (to work) (1)
	(c)	(i)	DNA (1)	1
		(ii)	mutation(s) (1)	1 not mutant
			Total	5

Question		Answer	Marks	Guidance					
4	(a)	The ingredient present in the largest amount is vegetable oil and The margarine contains more water than salt (1)	1	both correct for 1 mark <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td style="text-align: center;">√</td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;">√</td></tr> </table> if more than two ticks 0 marks	√				√
√									
√									
	(b)	(i)	to help oil and water to mix / to stop oil and water from separating / AW (1)	1 allow ingredients stay mixed allow to keep oil and water mixed ignore to join / stick / bond oil and water allow emulsifier binds oil and vinegar together					
		(ii)	hydrophobic (1)	1 allow phonetically correct spelling ignore fat-loving / water hating					
	(c)	13 (1)	1						
			Total	4					

Question			Answer	Marks	Guidance
5	(a)	(i)	50 (kJ) (1)	1	
		(ii)	5 (g) (1)	1	If answer line is blank allow $150 \div 30$
	(b)		oxygen (1)	1	allow O ₂ / O ignore O ² / O2
	(c)		carbon and hydrogen (1)	1	both required for mark allow C and H in any order

Question	Answer	Marks	Guidance
(d)	<p>any two from:</p> <p>idea of (high) energy value (1)</p> <p>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 ease of use (1)</p> <p>idea of storage (1)</p> <p>toxicity of fuel (1)</p> <p>idea of cost (1)</p> <p>idea of pollution given out / does it have a clean flame / is it smelly / AW (1)</p> <p>idea of volatility (1)</p> <p>viscosity of fuel (1)</p> <p>state / is it solid, liquid or gas (1)</p>	2	<p>allow more energy transferred / released / produced ignore efficiency or fuel efficiency</p> <p>allow can it run out / is it nearby / global stocks / how much in reserves / sustainability</p> <p>allow is it non-renewable</p> <p>allow is it easy to use / is it difficult to use / is it safe to use allow idea of flammability / how well it burns / ease of burning / ease of ignition</p> <p>allow can it be stored / how much space to store it ignore transportation</p> <p>allow is it poisonous / must be non-poisonous / no harmful effects if in contact with people / will it irritate skin ignore is it safe / harmful / explosive / dangerous</p> <p>allow how much waste is produced ignore environmentally friendly / effect on the environment</p>
	Total	6	

Question		Answer	Marks	Guidance
6	(a)	(fractional) <u>distillation</u> (1)	1	
	(b)	<p>any one from: petrol or 'it' is in high demand / AW (1) petrol or 'it' is in short supply / AW (1) supply of petrol or supply of 'it' is less than demand / AW (1) low(er) (relative) percentage in crude oil (1)</p>	1	<p>allow reverse argument, i.e., fuel oil is in low demand / AW allow reverse argument, i.e., fuel oil is plentiful / AW allow reverse argument, i.e., supply of fuel oil is greater than demand allow reverse argument, i.e., high(er) (relative) percentage of fuel oil in crude oil / AW ignore references to boiling point or number of atoms</p>
	(c)	<p>to make petrol / to make more useful substances (1)</p> <p>then one from: catalyst (1) high temperature (1)</p>	2	<p>allow higher level answers eg breaks larger hydrocarbon molecules / alkanes into smaller more useful ones (1) makes alkanes (1) makes alkenes (1) to match supply with demand / AW (1) not breaking down alkene, loses first marking point</p> <p>allow porcelain ignore high pressure ignore burn / heat the oil allow very hot but not just hot</p>
		Total	4	

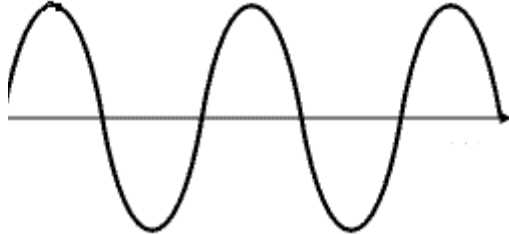
Question		Answer	Marks	Guidance
7	(a)	allows (water vapour from) sweat to escape / evaporate / AW (1)	1	allow avoids perspiration wetness not reduces sweating ignore will not get wet but can allow will not get wet from sweat
	(b)	(i) it is non-biodegradable so litters the beach (1)	1	more than 1 tick scores 0
		(ii) burning (of waste polymers) (1) recycling (1)	2	allow thermal decomposition ignore reused allow used as a chemical feedstock
	(c)	(i) monomers (1)	1	allow correct answer ticked, circled or underlined in list if answer line is blank
		(ii) poly(ethene) (1)	1	allow polyethene not poly(ethane)
		Total	6	

Question		Answer	Marks	Guidance
8	(a)	different materials / substances (1) different mass / weights (1)	2	either order allow examples eg made of steel, copper, lead / other named materials allow higher level answers different specific heat capacities ignore different colours ignore density
	(b)	stays the same (no mark) liquid is boiling (1)	1	allow changes into gas allow changing state allow higher level answers such as energy is needed to break inter-molecular bonds (1)
		Total	3	

Question		Answer	Marks	Guidance
9	(a)	contains (trapped) air (1)	1	
	(b)	90.3% (2) but if answer is incorrect $\frac{6500\ 000}{7200\ 000} (x100) = (1)$	2	allow 90% / 90.2% (2) allow 0.9 / 0.903 / 0.902 (2) but with incorrect or no units: 0.9% / 0.9J(1) 90 / 90N(1) allow 90.277777% / 0.90277777 (2) allow any cancelled down form eg $65 \div 72 / 6500 \div 7200 (x\ 100)$ (1)
		Total	3	

Question		Answer	Marks	Guidance
10	(a)	dull black (1)	1	If no answer on line, allow correct answer ringed, underlined or ticked in the question.
	(b)	(i) (TV) remote controls / movement detectors / heat detectors / security systems AW / data transfer (1)	1	allow burglar alarms / detecting things at night / night vision goggles ignore fire alarms allow controllers
		(ii) communication (1)	1	eg (mobile) phone allow radar
	(c)	<p>max two marks from each radiation</p> <p>infrared</p> <p>infrared heats or cooks surface or strikes surface (1)</p> <p>some energy in infrared oven used to heat the oven (1)</p> <p>infrared absorbed by glass or plastic (1)</p> <p>takes longer for energy to reach the centre with infrared / more time for centre to be cooked / cooking is slower (1)</p> <p>microwaves</p>	3	<p>allow heats the outside of the food / few mm allow idea of cooks from the outside in</p> <p>ignore reflection or bounce</p>

Question	Answer	Marks	Guidance
	<p>microwaves penetrate food or cook approx 1cm (1)</p> <p>all energy in microwaves used for cooking (1)</p> <p>microwaves go through glass or plastic (1)</p> <p>takes less time for energy to reach centre / less time for centre to be cooked / cooking is quicker (1)</p>		<p>allow a few cm allow idea energy transferred to water or fat or sugars allow heats water</p> <p>ignore reflection or bounce</p> <p>if the longer time for IR is awarded no mark for microwaves cook more quickly</p> <p>ignore the rest of the food is cooked by conduction and / or convection idea of KE passed on from particle to particle (of food)</p>
	Total	6	

Question		Answer	Marks	Guidance
11	(a)	digital (1)	1	
	(b)	(analogue is) a continuously variable signal (1)	1	<p>allow can have a range of values / any value / a value between 0 and 1 / has values other than 0 and 1</p> <p>allow a correct diagram eg</p>  <p>ignore not digital / not just on or off</p> <p>ignore diagrams unless labelled correctly</p> <p>ignore merely continuous wave</p>
	(c)	(i) amplitude (1)	1	
		(ii) trough (1)	1	
		Total	4	

Question		Answer	Marks	Guidance
12	(a)	ultraviolet / uv (1)	1	
	(b)	use a (high factor) sun cream (1)	1	allow sunblock or suntan lotion or SPF lotion for sun cream allow limit exposure to the sun ignore covering up skin
	(c)	any two from: more cars driven (1) more (fossil) fuels being burnt or more power stations (1) deforestation / forest fires (1) volcanic eruptions (1)	2	ignore increase in population / pollution from cars / pollution from factories ignore more factories / houses allow one mark for reduction in photosynthesis i.e. cutting trees down
		Total	4	

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