



# GCSE

## Science B

General Certificate of Secondary Education **B621/02**

Unit 1 Modules B1, C1, P1

## **Mark Scheme for June 2010**

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Question			Expected Answers	Marks	Additional Guidance
1	(a)		it is recessive (1)	1	<b>allow</b> only expressed if homozygous <b>allow</b> references to gene rather than allele <b>ignore</b> it is not dominant
	(b)	(i)	digests / breaks down fats / converts fats to fatty acids (and glycerol) (1)	1	if products are stated then they must be correct eg <b>not</b> digests fats to amino acids
		(ii)	diabetes (1)	1	<b>allow</b> type 1 or type 2 diabetes
	(c)	(i)	emulsifies them / breaks them down (into smaller droplets) (1)	1	<b>not</b> digests / breaks into smaller molecules/breaks fat down <b>allow</b> reduces surface tension / increases surface area
		(ii)	(drinking too much) alcohol (1)	1	<b>not</b> just drinking <b>allow</b> hepatitis / obesity / overweight
			<b>Total</b>	<b>5</b>	

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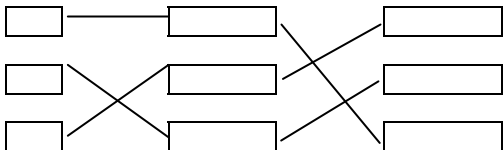
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Question			Expected Answers	Marks	Additional Guidance
2	(a)		sensory neurone (1)	1	more than one tick = zero marks
	(b)	(i)	proteins (1)	1	<b>allow</b> enzymes / amino acids / polypeptide <b>ignore</b> named protein
		(ii)	it changes the order of the bases (in DNA) / changes the amino acids in the protein (1)	1	<b>allow</b> changes the base code <b>ignore</b> changes the bases / base structure
	(c)		idea that some people get the drug and some do not / idea of a control group (1)  a person does not know whether or not they are taking the drug or not / use of a placebo or fake pill or sugar pill (1)  the doctors prescribing do not know either (1)	3	the people / trialists don't know whether or not they are taking the drug or not = 2
			<b>Total</b>	<b>6</b>	

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Question			Expected Answers	Marks	Additional Guidance
3	(a)	(i)	one is systolic and the other diastolic /  one is when the ventricles / heart contract and the other is when they relax (1)	1	
		(ii)	more salt / more fat / more alcohol / more sugar / more cholesterol (1)	1	<b>not</b> fibre / protein <b>ignore</b> named foods <b>allow</b> a lot of salt / fat etc <b>ignore</b> carbohydrate if list all must be correct
	(b)		more energy (is released) / does not produce lactic acid (1)	1	<b>allow</b> no oxygen debt <b>allow</b> less (likely to get) cramp / muscle fatigue <b>ignore</b> can exercise for longer unless qualified  <b>allow</b> ORA if anaerobic specified
	(c)			2	correct links on left hand side: (1)  correct links on right hand side: (1)
			<b>Total</b>	<b>5</b>	

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Question			Expected Answers	Marks	Additional Guidance
4	(a)	(i)	by mosquito (1)	1	<b>ignore</b> vector/sex of mosquito <b>not</b> if another organism or named vector is given as well as mosquito eg mosquito and water
		(ii)	<b>any two from:</b> heat stroke (1)  dehydration (1)  reduces enzyme action AW (1)  death of cells / individual (1)	2	<b>not</b> just stroke <b>allow</b> symptoms of heat stroke eg fainting / being sick / dizziness  <b>allow</b> loss of fluids <b>ignore</b> sweating
	(b)		tick in second box (1)	1	more than one tick = no marks
			<b>Total</b>	<b>4</b>	

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Question			Expected Answers	Marks	Additional Guidance
5	(a)		emulsifier / stabiliser (1)	1	
	(b)	(i)	hydrophilic end bonds to water molecules (1) hydrophobic end bonds with oil molecules (1)	2	<b>allow</b> marks from a diagram <b>allow</b> surrounded / attracted / bonds to / holds on to / sticks to but <b>ignore</b> loves / hates  If no marks scored from LHS: <b>allow</b> one end/part surrounded by water and the other by oil (1) <b>OR</b> <b>allow</b> idea that the emulsifier molecule has hydrophobic and hydrophilic parts (1)
		(ii)	mayonnaise (1)	1	<b>allow</b> mayo
	(c)		$2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$ (2)  correct formulae (1) balancing (1)	2	<b>allow</b> any correct multiple <b>allow</b> = for $\rightarrow$  <b>not</b> 'and' instead of + balancing mark is conditional on correct formulae  <b>allow</b> heat on the arrow but <b>not</b> + heat
	(d)		substance used - limewater / calcium hydroxide (solution) (1) result - turns cloudy / milky / white precipitate (1)	2	<b>allow</b> $\text{Ca}(\text{OH})_2$  <b>allow</b> both marks on the same line <b>ignore</b> murky / misty  independent marking
<b>Total</b>				<b>8</b>	

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Question			Expected Answers	Marks	Additional Guidance
6	(a)		top label - petrol (1) bottom label - bitumen (1)	2	
	(b)	(i)	they are broken / they are overcome (1)	1	<b>ignore</b> weakens <b>allow</b> bonds
		(ii)	interMFs (between large molecules) are stronger (than those between smaller molecules) /  more energy needed to break interMF's (1)	1	must state that forces / bonds / attractions are between molecules <b>allow</b> more interMFs to break <b>not</b> intraMF
	(c)	(i)	(making) polymers or plastics or poly(ethene) / making ethanol / alcohol (1)	1	<b>ignore</b> making bags <b>allow</b> making polythene bags / makes polythene bags / making plastic bags
		(ii)	it has a (carbon to carbon) double bond (1)	1	<b>not</b> has an equals sign
		(iii)	C <sub>2</sub> H <sub>4</sub> (1)	1	<b>allow</b> H <sub>4</sub> C <sub>2</sub>
			<b>Total</b>	<b>7</b>	



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Question		Expected Answers	Marks	Additional Guidance
7	(a)	<p><b>any two from</b></p> <p>idea of energy content (1)</p> <p>idea of availability / how long fuel will last (1)</p> <p>storage (1)</p> <p>idea of toxicity (1)</p> <p>idea of pollution / emissions (1)</p> <p>easy to use / ignite / burn (1)</p> <p>how easy / expensive is it to transport (1)</p>	2	<p>eg gives off lots of energy / heat (1)</p> <p>eg easy to get hold of / how fast will it run out / is it renewable (1)</p> <p><b>allow</b> is the fuel harmful <b>ignore</b> dangerous</p> <p>eg does it cause acid rain or greenhouse effect or global warming / damage to the environment (1) <b>not</b> ozone layer</p> <p><b>ignore</b> efficiency of fuel</p>
	(b)	<p>11760 (J) scores (2)</p> <p>BUT if answer incorrect  <math>\frac{17640}{1.5}</math> or <math>\frac{\text{energy released}}{\text{mass}}</math> scores (1)</p>	2	<p><b>allow</b> <math>\frac{2}{3} \times 17640</math> (1)</p>
	(c)	<p>energy or heat given out / energy released into surroundings (1)</p>	1	<p><b>allow</b> temperature rise</p>
		<b>Total</b>	<b>5</b>	

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Question			Expected Answers	Marks	Additional Guidance
8	(a)		<div> <div>√</div> <div>(X)</div> <div>√</div> <div>(X)</div> <div>√</div> <div>√</div> <div>√</div> </div>	2	<b>all</b> correct (2) <b>any</b> 3 correct /2 incorrect (1)
	(b)	(i)	C (1)	1	
		(ii)	A (1)	1	
			<b>Total</b>	<b>4</b>	

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Question		Expected Answers	Marks	Additional Guidance
9	(a)	(minimum) angle at which TIR occurs /  above this angle TIR occurs /  above this angle there is no refraction /  at this angle the ray travels along the boundary between the glass and air (1)	1	<b>not</b> total internal refraction
	(b) (i)	rays transmitted and angle of refraction greater than $30^\circ$ by inspection (1)	1	<b>ignore</b> any reflections
	(ii)	ray comes out along the boundary to the right (1)	1	<b>not</b> if shows any refraction <b>allow</b> a reflection at $42^\circ$ on its own or in addition to line along boundary <b>not</b> if a reflection is shown clearly at a different angle to $42^\circ$
	(iii)	ray is reflected at same angle as incident angle by inspection or labelled as $60^\circ$ (1)	1	<b>not</b> if it shows any refraction
	(c)	interleaving (of several signals) / AW more than one signal (down a line) at the same time / together (1)	1	<b>not</b> several signals in the same wave
		<b>Total</b>	<b>5</b>	

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Question		Expected Answers	Marks	Additional Guidance
10	(a)	<p>1 mark for each type of energy transfer</p> <p>(air in) foam is a poor conductor/reduces conduction or (air in) foam is an insulator (1)</p> <p>stopper reduces convection or (air in) foam / trapped air reduces convection (1)</p> <p>shiny metal case reflects radiation / heat / energy or shiny metal stops radiation /IR (1)</p>	3	<p>There must be a link between the heat transfer process and the feature</p> <p><b>not</b> shiny metal stops conduction <b>ignore</b> stopper prevents conduction</p> <p><b>not</b> shiny metal stops convection</p> <p><b>not</b> foam stops radiation <b>not</b> stopper prevents radiation <b>not</b> away from the mug</p>
	(b)	<p>82.5 (3)</p> <p><b>but if answer incorrect</b> 62.5 (2)</p> <p><b>or</b> <math>9000 = 800 \times 0.18 \times \text{temp rise}</math> (1) <b>or</b> clearly states adding 20 to incorrect calculation figure (1)</p>	3	<p><b>allow</b> 83 (3)</p> <p><b>allow</b> 63 (2)</p> <p><b>allow</b> <math>\frac{9000}{0.18 \times 800}</math> (= temp rise) (1)</p>
		<b>Total</b>	<b>6</b>	

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Question			Expected Answers	Marks	Additional Guidance
11	(a)		idea that it pays back in only six months / payback is short / starts saving money quickly (1)	1	allow less than a year
	(b)		1000 (KWh) (1)	1	
			<b>Total</b>	<b>2</b>	

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Question			Expected Answers	Marks	Additional Guidance
12	(a)		dust prevents (Sun's) radiation from reaching Earth (1)	1	<b>allow</b> dust reflects radiation / blocks out heat from the sun / absorbs suns heat / IR / suns rays  <b>ignore</b> just there is dust in the atmosphere / blocks the sun <b>ignore</b> UV / sunlight
	(b)		use of CFCs (1)  destroys (AW) ozone layer (1)	2	greenhouse effect or any incorrect gases loses the CFC mark
			<b>Total</b>	<b>3</b>	

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