

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	allow only expressed if homozygous allow references to gene rather than allele ignore 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 not digests fats to amino acids
	(ii)	diabetes (1)	1	allow type 1 or type 2 diabetes
	(c) (i)	emulsifies them / breaks them down (into smaller droplets) (1)	1	not digests / breaks into smaller molecules/breaks fat down allow reduces surface tension / increases surface area
	(ii)	(drinking too much) alcohol (1)	1	not just drinking allow hepatitis / obesity / overweight
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	sensory neurone (1)	1	more than one tick = zero marks
	(b) (i)	proteins (1)	1	allow enzymes / amino acids / polypeptide ignore named protein
	(ii)	it changes the order of the bases (in DNA) / changes the amino acids in the protein (1)	1	allow changes the base code ignore 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
		Total	6	

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	not fibre / protein ignore named foods allow a lot of salt / fat etc ignore carbohydrate if list all must be correct
	(b)		more energy (is released) / does not produce lactic acid (1)	1	allow no oxygen debt allow less (likely to get) cramp / muscle fatigue ignore can exercise for longer unless qualified allow ORA if anaerobic specified
	(c)			2	correct links on left hand side: (1) correct links on right hand side: (1)
Total				5	

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

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

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	ignore weakens allow 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 allow more interMFs to break not intraMF
	(c) (i)	(making) polymers or plastics or poly(ethene) / making ethanol / alcohol (1)	1	ignore making bags allow making polythene bags / makes polythene bags / making plastic bags
	(ii)	it has a (carbon to carbon) double bond (1)	1	not has an equals sign
	(iii)	C ₂ H ₄ (1)	1	allow H ₄ C ₂
		Total	7	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	<p>any two from</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>allow is the fuel harmful ignore dangerous</p> <p>eg does it cause acid rain or greenhouse effect or global warming / damage to the environment (1) not ozone layer</p> <p>ignore efficiency of fuel</p>
	(b)	<p>11760 (J) scores (2)</p> <p>BUT if answer incorrect</p> <p>$\frac{17640}{1.5}$ or $\frac{\text{energy released}}{\text{mass}}$ scores (1)</p>	2	<p>allow $\frac{2}{3} \times 17640$ (1)</p>
	(c)	<p>energy or heat given out / energy released into surroundings (1)</p>	1	<p>allow temperature rise</p>
Total			5	

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

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	not total internal refraction
	(b) (i)	rays transmitted and angle of refraction greater than 30° by inspection (1)	1	ignore any reflections
	(ii)	ray comes out along the boundary to the right (1)	1	not if shows any refraction allow a reflection at 42° on its own or in addition to line along boundary not if a reflection is shown clearly at a different angle to 42°
	(iii)	ray is reflected at same angle as incident angle by inspection or labelled as 60° (1)	1	not 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	not several signals in the same wave
		Total	5	

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>not shiny metal stops conduction ignore stopper prevents conduction</p> <p>not shiny metal stops convection</p> <p>not foam stops radiation not stopper prevents radiation not away from the mug</p>
	(b)	<p>82.5 (3)</p> <p>but if answer incorrect 62.5 (2)</p> <p>or $9000 = 800 \times 0.18 \times \text{temp rise}$ (1) or clearly states adding 20 to incorrect calculation figure (1)</p>	3	<p>allow 83 (3)</p> <p>allow 63 (2)</p> <p>allow $\frac{9000}{0.18 \times 800}$ (= temp rise) (1)</p>
		Total	6	

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	
Total			2	

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

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