

Science B

General Certificate of Secondary Education

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

Mark Scheme for January 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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Annotations

Annotation	Meaning
	correct response
	incorrect response
	benefit of the doubt
	benefit of the doubt not given
	error carried forward
	information omitted
	ignore
	reject
	contradiction

Subject-specific Marking Instructions

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

- / = 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 = alternative wording
- ora = or reverse argument

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Question			Expected Answers	Marks	Additional Guidance
1	(a)		near the equator (1)	1	allow either side of the equator not in the middle of the country allow where it is hotter ignore comparison of countries
	(b)		inherited genes(1) fungi (1)	2	
			Total	3	

Question			Expected Answers	Marks	Additional Guidance
2	(a)	(i)	site of reading eg wrist / neck ankle / temple (1) count number of pulses in a minute (1)	2	ignore pressure point or on a pulse allow count number of pulses in a fixed amount of time allow heartbeats for pulses
		(ii)	iron is needed to make haemoglobin / idea that haemoglobin contains iron (1)	1	allow shortage of iron causes anaemia allow more iron, more haemoglobin is made
	(b)	(i)	anabolic steroids (1)	1	
		(ii)	allows more oxygen (to the muscles) (1) allows more glucose (to the muscles) (1) removes carbon dioxide (from the muscles) faster (1)	3	allow oxygen intake increases allow blood carries oxygen / glucose round the body faster allow prevents / reduces anaerobic respiration / lactic acid build up
	(c)		sweating / more blood flow close to the skin (1)	1	ignore pulse rate increases allow vasodilation
			Total	8	

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Mark Scheme

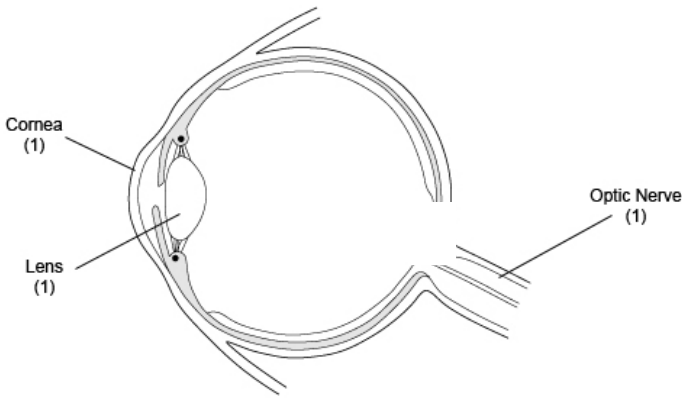
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Question			Expected Answers	Marks	Additional Guidance
3	(a)		Gazza (1)	1	
	(b)		Arthur (1)	1	
	(c)		it contains least protein (1)	1	allow not enough protein / too little protein ignore less protein
	(d)	(i)	calculation: she needs 60g (1)	1	
		(ii)	answer (yes) because she is eating 62g (1)	1	allow ECF from (d)(i) allow she is eating more than her RDA / 60g (1) ignore she is eating enough
			Total	5	

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Question			Expected Answers	Marks	Additional Guidance
4	(a)		 <p>Cornea (1)</p> <p>Lens (1)</p> <p>Optic Nerve (1)</p>	2	
	(b)		<p>long sight: eye or lens wrong shape (1)</p> <p>red-green colour blindness: lack of certain cells / cones / receptors in the retina (1)</p>	2	<p>allow lens too thin / eye too short / lens not powerful enough / eye muscles too weak</p> <p>allow specific / certain cells in the retina not working not rods</p>
			Total	4	

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Question			Expected Answers	Marks	Additional Guidance
5	(a)		takes a (much) longer time to be formed (than it does to use) (1)	1	not it cannot be used again ignore it cannot be made again allow it takes a long time to form / was made a long time ago (1) it is a fossil fuel is not sufficient
	(b)	(i)	bitumen (1)	1	Mark answer on the line first If no response on line allow other ways of indicating correct response eg ringing or ticking the correct answer
		(ii)	petrol / ethene (1)	1	allow alkenes / methane / propane / propene / butane / butene
	(c)	(i)	paraffin (1)	1	allow (10-16) or (176 – 275)
		(ii)	hydrogen and carbon (1)	1	ignore symbols allow either order
		(iii)	paraffin (1)	1	allow (10-16) or (176 – 275)
			Total	6	

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Question			Expected Answers	Marks	Additional Guidance
6	(a)		oxygen (1)	1	allow O / O ₂
	(b)		any two from: availability (1) physical state / solid, liquid or gas (1) is it toxic (1) will it pollute (the atmosphere) (1) flash point / flammability / ease of burning (1) ease of use (1) storage (1) density (1) sustainability / renewable (1) will engine run on new fuel / cost of converting engine to new fuel (1)	2	allow amount of named pollutant ignore weight of fuel / cost of fuel / safety unless qualified
	(c)	(i)	B (1) biggest temperature rise / largest temperature change (1)	2	If fuel line left blank mark explanation, If A,C or D chosen the candidate cannot score for the explanation not highest temperature at end allow temperature rise = 28 if clear differences have been calculated
		(ii)	not enough oxygen / incomplete combustion / shortage of oxygen / AW (1)	1	allow not enough air / shortage of air
			Total	6	

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Question			Expected Answers	Marks	Additional Guidance
7	(a)		15 (1)	1	allow any other way of indicating 15 eg ring or ticking answer in the list answer on answer line takes precedence
	(b)		stop food reacting with oxygen / air (1)	1	ignore stops the food going off / keeps food fresh for longer / extends the life of the food
	(c)	(i)	to stop oil and water from separating / to keep oil and water mixed together	1	allow so mayonnaise does not separate / stays mixed / stays together not to mix ingredients
		(ii)	salad cream / salad dressing / egg / tomato ketchup / biscuits / breakfast cereals / cakes / desserts / 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 / yoghurts / frankfurters / mortadella / luncheon meat / pate / butter / cream / sausage / sauce (1)	1	ignore mayonnaise
	(d)	(i)	any one from: does not react with food / does not react with oil / does not react with water non-porous / will not let water through / waterproof (1) does not dissolve in water / does not dissolve in oil (1) flexible can be squeezed (1) non-toxic (1) Lightweight / low density (1) Easily moulded (1) Cheap (1)	1	ignore light ignore transparent
		(ii)	does not decay / does not rot / does not decompose / cannot be broken down by micro-organisms / cannot be broken down by sunlight / does not break down (1)	1	

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Question			Expected Answers	Marks	Additional Guidance
		(iii)	any two from: landfill / bury underground (1) burn / incinerate (1) recycling / re-use / broken down to make other things (1) cracked (1)	2	
			Total	8	

Question			Expected Answers	Marks	Additional Guidance
8	(a)		any two from: increased energy use (1) increased CO ₂ / carbon emissions (1) deforestation (1)	2	allow increased use of (fossil) fuels (1) allow increased population (using more energy) (1) allow more factories / homes / cars (1)
	(b)	(i)	reduces temperature / causes cooling (1)	1	
		(ii)	<u>reflects</u> radiation / heat (from town) back to Earth (1)	1	ignore traps heat or radiation
			Total	4	

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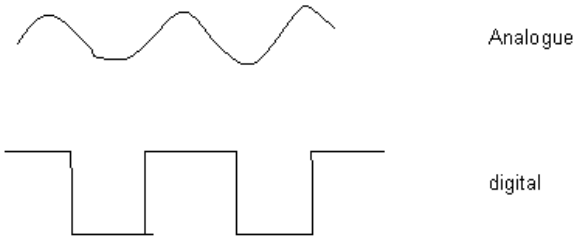
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Question			Expected Answers	Marks	Additional Guidance
9	(a)		(tick in second box) it is a form of draught proofing and reduces the amount of cold air that can enter the room (1)	1	more than one tick scores 0
	(b)		double / triple glazing (1)	1	allow reflective film (1) but not silver foil allow thicker glass but not just more glass (1) allow secondary glazing (1) allow reduce the temperature of the room (1) ignore reduce window size ignore shutters
	(c)	(i)	rises (in cavity) (1)	1	allow higher level answers eg gets less dense / expands / sets up a convection current / allows the air to circulate
		(ii)	(£) 125 (1)	1	
			Total	4	

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Question			Expected Answers	Marks	Additional Guidance
10	(a)		reflected (1)	1	allow total internal reflection / TIR (1) ignore bounces
	(b)		light (1) radio waves (1)	2	if more than two ringed -1 for each additional ring – minimum 0 eg 2 correct 3 ringed scores 1 1 correct 3 ringed scores 0
	(c)		analogue – any value / continuously variable (1) digital – on and off / 1 and 0 / only has two values (1)	2	allow correctly labelled diagrams  allow reference to range of values of wavelength / frequency / amplitude not just values vary
	(d)		any one from: cooking (1) remote control (1) data link for computer (1) sensor for burglar alarm / security light (1)	1	allow control for TV / DVD / video / doors / air conditioning (1) allow toaster, toasted sandwich maker or grill mark the use , ignore any other radiation mentioned
			Total	6	

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Question			Expected Answers	Marks	Additional Guidance
11	(a)		299 700 000 / 2.997×10^8 (1)	1	allow 300 000 000 / 3×10^8 (1)
	(b)		cooking (1)	1	allow microwave oven (1) allow to heat up food ignore Mobile Phones
	(c)		any two from: warm brain / absorbed by water or fat molecules in brain (1) (possible) risk of cancer (1) young children more at risk / still developing (1)	2	allow higher level answers eg cause fat / water molecules to vibrate (1) allow causes tumour / brain damage / damage cells harm cells (1) ignore type of radiation if mentioned
			Total	4	

Question			Expected Answers	Marks	Additional Guidance
12			energy \rightarrow J (1) mass \rightarrow kg (1)	2	
			Total	2	

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