GCSE SCIENCE - PHYSICS 1

FOUNDATION TIER

Question			Marking details	Marks
1.	(a)		visible light – infrared - microwaves all correct – 2 marks 1 or 2 correct – 1 mark	2
	(b)	(i)	17[%] (accept 100-83)	1
		(ii)	increases / heats up / rises (accept – very hot / gets hot / warms it up)	1
	(c)		ticks in boxes 2, 3 & 4 (3x(1) – each additional tick over 3 loses a mark)	3
			Question total	**[7]**
2.	(a)		2.2 [kW]	1
	(b)	(i)	X	1
		(ii)	3 960 000 J	1
		(iii)	use of 1.6 (1) conversion of 30 min to 0.5 h and multiply (1) Answer 0.8 [kWh] scores (2) Answer 48 – 1 mark (1.6 x 30 – uses the correct power) 0.5 / 1.1 / 500 / 1 100 / 800 – 1 mark (has converted time correctly) (1.6 ÷ 0.5) = 1 mark only	2
		(iv)	0.8 (**ecf**) x 15 = 12 [p] mark is for the answer. Don't accept £0.12 p	1
			Question total	**[6]**
3.		(i)	beta	1
		(ii)	Any 2 x (1): - alpha would not penetrate through [that much] air - gamma would not be absorbed by [that much] air - beta blocked by that much air answer **must** refer to penetration through **air** or implied through air e.g. alpha would not get that far	2
		(iii)	Any 2 x (1): repeat [the experiment] (accept more results) measure [counts] over a longer period of time take readings at smaller distance intervals start taking readings at 0 (accept increase the range) use a different part of the quarry wall Don't accept: more people do the experiment / better detectors	2
		(iv)	[decay is] random / no pattern / decay at different times / decay is disorganised. (Do not accept unpredictable.)	1
			Question total	**[6]**

Question			Marking details	Marks
4.	(a)	(i)	1 000 x 25 = 25 000 [kg] mark is for the answer on answer line	1
		(ii)	25 000 (**ecf**) x 120 (1) = 3 000 000 [J] (1)	2
	(b)		$\frac{1.8}{2}$ x 100 (1) = 90[%] (1) Answer 0.9 – 1 mark	2
	(c)		back up or quick start (1) when demand increases e.g. at breakfast time / break in a sporting event / another power station has broken down (1) **Either mark can be awarded on its own but only award 2 marks if they are linked.**	2
	(d)	(i)	reduce energy or heat losses / increase efficiency (do not accept just reduce the current or there is no heat loss)	1
		(ii)	[low voltages are] saf**er** / high voltages are dangerous / for safety	1
			Question total	**[9]**
5.	(a)	(i)	30 thousand [years]	1
		(ii)	8.3 [minutes] (ignore reference to light if written)	1
		(iii)	13 [light hours]	1
		(iv)	accept > 0.4 [AU] and <1 [AU]	1
	(b)	(i)	absorbing (1)	2
		(ii)	red shifted (1)	
	(c)	(i)	A	1
		(ii)	B	1
			Question total	**[8]**

Question			Marking details	Marks
6.	(a)	(i)	Gas (1) because it produces <u>smallest amount / less carbon dioxide or carbon monoxide</u> (1) accept converse argument. **Either mark can be awarded on its own but only award 2 marks if they are linked.**	2
		(ii)	Gas (1) because it produces <u>smallest amount / less sulfur dioxide or nitrous oxide</u> (1) (e.g. accept because sulphur dioxide is 1). Accept converse argument. **Either mark can be awarded on its own but only award 2 marks if they are linked.**	2
	(b)	(i)	heats water / produces steam (accept they use cold water)	1
		(ii)	operates 24 hours a day (accept not always sunny / rocks are always hot / produces electricity in the night / [more] reliable)	1
	(c)	(i)	plots (2) ± ½ small square division (ignore any other points that are plotted) -1 mark for each incorrect plot up to a max of 2 straight line (1) (ignore any line before the 1st point). Don't accept double lines / whispy / disjointed / wobbly lines or the line missing points.	3
		(ii)	6.5 ± 0.05 [km] **ecf** value must be taken from their graph	1
	(d)		$\frac{2400000}{2000}$ (1) = 1 200 (1)	2
			Question total	**[12]**

Question			Marking details	Marks
7.	(a)		4 (1), 20 (1)	2
	(b)		Indicative content: The advantages of insulating the loft are of primary importance. The money spent is the least, it is recouped in the shortest time and gives the greatest gain in energy loss reduction (2 700 W), this accounts for £800 of the spending money. The cavity wall insulation is of second priority with an outlay of £1200, a payback time of just 10 years and the next greatest energy saving of 1 700 W. The remaining money of £1200 is better spent on replacing their doors because of the smaller payback time. The doors have a payback time of 60 years but save only 200 W in total. [The total spend is £3 200 with an annual saving of £340 giving a payback time of 9.4 years.] **5 – 6 marks** The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar. **3 – 4 marks** The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar. **1 – 2 marks** The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar. **0 marks** The candidate does not make any attempt or give a relevant answer worthy of credit.	6
	(c)		loft / roof, cavity / wall, windows [2 marks for all correct, 1 mark for 1 or 2 parts correct]	2
	(d)		[Inner] wall / house heats the air (1) which becomes less dense / rises (1) **Either mark can be awarded on its own but only award 2 marks if they are linked.**	2
			Question total	**[12]**
			Foundation tier paper total	**[60]**