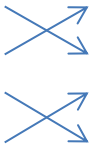
GCSE Science - Physics 1 Mark Scheme

January 2013

FOUNDATION TIER

Question			Marking details	Mark
1.			1st and 4th boxes ticked. **Question total**	2 **[2]**
2.			 Any 1 correct - 1 mark Any 2 correct – 2 marks Any 3 or all four correct – 3 marks **Question total**	3 **[3]**
3.			Beta stopped at aluminium (1) Gamma stopped at lead or passes through the lead (1) Alpha stopped at thin paper (1) **Question total**	3 **[3]**
4.	(a) (b) (c)		Earth, Sun, Solar system. Milky Way, Universe. All in correct positions – 4 marks, 4 correct- 2 marks, 3 correct – 2 marks, 2 correct – 1 mark Milky Way It is a <u>distance</u> (travelled by light in 1 year) **Question total**	4 1 1 **[6]**
5.	(a) (b) (c)		Radon 15 [cpm] Nuclear industry accounts for <u>only</u> 1% / a <u>very</u> small part **Question total**	1 1 1 **[3]**
6.	(a) (b) (c) (d) (e)		15 [cm] 20 [cm] $f = \frac{10}{5}$ (1) = 2 [Hz] (1) wave speed = 20 (ecf) x 2 (ecf) (1 – substitution) = 40(1) Unit cm/s (1) stay the same **Question total**	1 1 2 3 1 **[8]**

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Question			Marking details	Mark
7.	(a)	(i)	radiation	1
		(ii)	conduction	1
	(b)		Warm air is less dense than cold air (1) so it rises (1)	2
	(c)	(i)	20[%]	1
		(ii)	The cost [of insulation] is the <u>least</u> of all (accept "<u>just</u> £600")(1) and the annual saving is the <u>greatest</u> (accept "<u>shortest</u> payback time") (1)	2
		(iii)	conducted through the ceiling (1) then convected through the attic space(1).	2
			Question total	**[9]**
8.	(a)	(i)	best ability to conduct electricity	1
		(ii)	Lead	1
		(iii)	Steel provides the strength (up to 2 000 units) (1), aluminium is used for its low density (1) meaning the wires aren't too heavy (1)	3
	(b)		mass = 2 700 x 0.12 (1 substitution) = 324 [kg] (1)	2
			Question total	**[7]**
9.	(a)	(i)	900 or 1 800 <u>MHz</u> (1) (value + unit for the mark)	1
		(ii)	The bigger the frequency, the <u>smaller</u> the output power (1) whereas to be proportional, as one increases, the other would increase.(1) OR EQUIVALENT	2
		(iii)	more research (1) by <u>other</u> scientists (1)	2
	(b)		microwaves	1
			Question total	**[6]**
10.	(a)		Indicative content: Cost of generating electricity using nuclear energy is cheaper than wind. To generate the same power output requires 1 800 turbines for every nuclear power station which would cost £5 400 million compared with £4 000 million. Also during the lifetime of a nuclear power station, wind turbines would need to be replaced 3 times. There is no waste produced by wind but with nuclear power there is radioactive waste to dispose of which adds cost and has an impact on the environment due to radiation hazards. Onshore wind power would produce less of a greenhouse effect than nuclear but offshore wind would produce more.	6

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Question			Marking details	Mark
			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.	
	(b)	(i)	plots (1) x2 smooth curve or best fit straight line (1)	3
		(ii)	As rotor diameter increases so does the maximum power output (1) but the increase is non-uniform / at an increasing rate / non-linear / not proportional (1)	2
	(c)		Efficiency = $\frac{3}{5}$ x 100 (1 substitution) = 60[%] (1)	2
			Question total	**[13]**
			Foundation paper total	**[60]**

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