GCSE Science - Physics 1

Marking Scheme - Summer 2014

FOUNDATION TIER

Question				Marking details	Marks
1.	(a)	(i)		[Overhead] cables **Don't accept** National Grid	1
		(ii)		Step-down [transformer]	1
		(iii)		Step-up [transformer]	1
	(b)			**Any 2 ×(1) from:** • [More] reliable - **Don't accept** more efficient • [In case a power station breaks down for] back up • Can react to a changing demand **Don't accept** a better electricity supply **or** more power **or** gives electricity when needed.	2
				Question total	**[5]**
2.		(i)		Infra-red (1) Micro[waves] (1) Micro[waves] (1)	3
		(ii)		Radio [waves]	1
				Question total	**[4]**
3.	(a)	(i)		Same number <u>of lines</u> / four <u>lines</u> (1) <u>Lines</u> at same wavelength / <u>lines</u> at same place (1) **Don't accept** same colours **Award 1 mark** for they're both black on the right hand side	2
		(ii)		One has bright/coloured **or** dark [background] / One has black lines **or** coloured lines / colours missing in top spectrum are on the bottom spectrum. **Don't accept** colours in reverse **or** different colours	1
	(b)	(i)		<u>Lines</u> have moved to red end **or** wavelength of <u>lines</u> is increased **or** <u>lines</u> have different wavelengths **or** <u>lines</u> are red shifted **or** <u>lines</u> shifted to the right / <u>lines</u> are in different positions	1
		(ii)		<u>Moving away</u> don't accept further away	1
	(c)			No <u>matching lines</u> crossing spectrum [from neon or mercury] / because it <u>only</u> has lines for hydrogen / it only has four <u>lines</u> / it is the hydrogen spectrum. **Treat as neutral** any reference to not enough lines or double lines.	1
				Question total	**[6]**

Question				Marking details	Marks
4.	(a)	(i)		Desktop / PC	1
		(ii)		2005	1
		(iii)		Desktop / PC	1
		(iv)		CRT [monitor] (1) **Don't accept** the green line because biggest drop [in units used or energy consumed (1) **To award both marks both statements must be linked.**	2
	(b)	(i)		% efficiency = useful energy transfer × 100 total energy input $= \frac{18}{90} \times 100 = 20[\%]$ (1) for substitution (1) answer Correct answer only gets 2 marks **Award 1 mark** for 0.2	2
		(ii)		72 [J]	1
		(iii)	(I)	Division by 3 (1) [£]1.50 (1)	2
			(II)	[£]3.00 (**ecf for £4.50 – answer in (b)(iii)(I)**) If answer in (b)(iii)(I) is bigger than £4.50 a negative answer is required.	1
				Question total	**[11]**
5.	(a)			Conduction (1) radiation (1) hot **and** cold (1) [both in correct order for mark] [**NOT** right to left]	3
	(b)	(i)		46 (1) 70 (1)	2
		(ii)		30 [s]	1
	(c)	(i)		**Any 2 ×(1) from:** • Same diameter **or** same thickness • Identical drawing pins **or** same mass of drawing pins • Same flame **or** same flame temperature **or** same starting temperature • Same type of wax **or** same amount of wax • Same distance between pins (**NOT** same length / same temperature only / same number of pins)	2
		(ii)		Steel is a poorer conductor / rate of conduction in steel is lower / so heat travels through it slower (1) so time before pins drop off would be longer (1) **To award both marks both statements must be linked.**	2
				Question total	**[10]**

Question				Marking details	Marks
6.	(a)	(i)		Alpha / α / helium nucleus	1
		(ii)		1 000 [counts per minute]	1
		(iii)		1 000 [counts per minute]	1
	(b)	(i)		Plots (allow ± ½ small square division) (2) -1 for each error to a maximum of 2 Smooth curve between 10 and 50 mm allow ± ½ small square division (1) **Don't allow** wispy, wobbly, thick, double lines	3
		(ii)		As the thickness increases, the counts per minute (count rate) decreases (1) in smaller and smaller intervals / at a decreasing rate (1) **Treat as neutral:** in a non-linear way **or** gradient decreases as the thickness increases **ecf** from graph **Award 2 marks for:** every 10 mm the count rate halves	2
		(iii)	(I)	1 000 (1) but not on answer line ¼ expressed in any terms **or** 0.25 (1) **Accept** 25%	2
			(II)	125 (1) [counts per minute] The count rate halves every 10 mm (1) **Accept** is a quarter of the 40 mm value **or** half the 50 mm value **Or** extrapolated graph (1) value between 50 – 200 (1)	2
				Question total	**[12]**
7.	(a)	(i)		**Indicative content:** Mass of measuring cylinder (from the first diagram)= 112 g Mass of measuring cylinder + liquid (from the second diagram)= 172 g Volume of liquid (from the third diagram) = 75 cm^3 Mass of liquid = 60 g $\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{60}{75} = 0.8\ \text{g/cm}^3$ **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.	6

Question				Marking details	Marks
				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.	
		(ii)		**Any 2 ×(1) from:** • Better resolution / more precise / smaller increments / smaller divisions on balance / cylinder • Use a cylinder that measures to the nearest ml • Use a balance that measures to 1 decimal place • Take measurements at eye level • Bigger volume (amount) of liquid • Use a pipette **or** burette **or** volumetric flask **or** syringe • Take repeat readings with different volumes of oil	2
	(b)	(i)	(I)	1.4 MW **(unit with answer** for the mark)	1
			(II)	Density is bigger **accept** density of air is smaller	1
		(ii)		Water flow / tides (**NOT** waves) is more constant / more regular / more reliable (1) <u>so</u> the power output is more constant (1) **Alternative:** Water turbines are below the water / out of sight (1) <u>so</u> visual / noise pollution is less (1) **Alternative:** Water turbines are <u>smaller</u> (1) <u>so</u> cheaper to build / can be sited more densely / sited in shallow water / less harmful to wildlife (1) **To award both marks both statements must be linked.**	2
				Question total	**[12]**
				Foundation tier paper total	**[60]**