GCSE Science A Physics 1

Higher Tier

Physics 1H

SPECIMEN MARK SCHEME

Version 1.0

Quality of Written Communication and levels marking

In Question 4(d) candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

In order to attain a mark within a certain level, **both** the science **and** the QWC must be of a standard appropriate to that level.

COMPONENT NUMBER: PH1HP

COMPONENT NAME: GCSE Science A Physics 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
1(a)	ray drawn from tooth to mirror to eye		1
	angle I = angle R	judged by eye	1
	at least one arrow in correct direction	do **not** credit conflicting arrows if no ruler used maximum mark is **2**	1
1(b)	virtual		1
	upright		1
Total			**5**

COMPONENT NUMBER: PH1HP

COMPONENT NAME: GCSE Science A Physics 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
2(a)	40 (cm/s)	correct answer an answer 0.4 m/s gains full credit if answer is incorrect allow **1** mark for correct wavelength λ = 8 cm **or** allow **2** marks for correct substitution into the correct equation, ie. V = 5 x 8 **or** allow **2** marks for clearly stated wrong wavelength correctly substituted into correct equation and correctly calculated, ie λ = 16 cm/s V = 5 x 16 = 80	3
2(b)	line extended following pattern 14 m/s	 accept their numerical value, if not 14, provided the first mark has been awarded	1 1
Total			**5**

COMPONENT NUMBER: PH1HP

COMPONENT NAME: GCSE Science A Physics 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
3(a)(i)	to compare mobile phone usage between the two groups		1
3(a)(ii)	enough data to indicate relationships **or** reduce effect of anomalous data		1
3(b)(i)	ethical		1
3(b)(ii)	research may be biased (in favour of companies) negative effects on health may not get published	 accept negative effects on health may be played down	1 1
3(b)(iii)	it allows people to easily identify lower risk phones and this allows people to make a more informed choice	 accept and this allows a comparison to be made	1 1
Total			**7**

COMPONENT NUMBER: PH1HP

COMPONENT NAME: GCSE Science A Physics 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
4(a)	because black is a good absorber of radiation		1
	therefore there will be a faster transfer of energy	allow therefore the temperature of the water rises faster	1
4(b)	16 800 000	allow **1** mark for substitution into correct equation ie 100 x 4200 x 40	2
4(c)	7	allow ecf from part (b)	1

Question 4 continues on the next page . . .

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4(d)			
Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 2.			
0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**
No relevant content.	There is a brief description of the advantages and disadvantages of using solar energy to heat the water rather than using an electric immersion heater, including either advantages or disadvantages from the **examples** below.	There is a description of some of the advantages **and** disadvantages of using solar energy to heat the water rather than using an electric immersion heater, with at least **one** advantage and **one** disadvantage from the **examples** below.	There is a clear, balanced and detailed description of the advantages **and** disadvantages of using solar energy to heat the water rather than using an electric immersion heater, with a minimum of **two** advantages and **two** disadvantages from the **examples** below.

examples of the physics points made in the response	**extra information**
advantages	
• a renewable energy source	
• energy is free	
• does not pollute the atmosphere	accept specific examples of polluting gases
• no fuel is burnt	
• energy can be stored (in the water)	
disadvantages	
• only available in daylight hours	
• availability fluctuates	accept unreliable energy source
• insufficient hours of sunlight in some countries	
• average low intensity in some countries	

Total			**11**

COMPONENT NUMBER: PH1HP

COMPONENT NAME: GCSE Science A Physics 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
5(a)	decrease in (proportion of) oil as reserves are decreasing	no marks are awarded for simply describing the differences	1
	increase in (proportion of) coal / nuclear / gas / as new reserves / more nuclear power stations built		1
5(b)(i)	a prediction		1
	forecast based on scientific evidence		1
5(b)(ii)	less methane goes into the atmosphere	accept air for atmosphere	1
	therefore making global warming less rapid		1
5(c)	idea that many devices transform electricity into other useful forms of energy		1
	example related to public health eg refrigeration / production of vaccines / X-ray machines		1
	example related to modern communications eg Internet / telephones		1
Total			**9**

COMPONENT NUMBER: PH1HP

COMPONENT NAME: GCSE Science A Physics 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
6	transformer **X** reduces the current through the transmission cables	accept increases p.d. across the cables	1
	this reduces the energy loss from the cables		1
	which increases the efficiency of the distribution system		1
	transformer **Y** is essential as it reduces the p.d. to a safe working value for consumers		1
Total			**4**

COMPONENT NUMBER: PH1HP

COMPONENT NAME: GCSE Science A Physics 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
7(a)	1.8 (p)	these **4** marks can be broken down as follows: **1** mark for correct transformation and substitution into efficiency equation ie 0.8 x 1200 = useful power PLUS **1** mark for useful power = 960 W / 0.96 kW PLUS **1** mark for waste energy transferred = 0.24 x 0.5 **or** waste energy transferred = 0.12 (kWh) PLUS **1** mark for cost = 0.12 x 15 where a mathematical error has been made full credit should be given for subsequent correct method	4
7(b)	the waste energy is transferred as heat and sound to the surroundings where it spreads out / is shared by surrounding particles	 accept air for surroundings	1 1
Total			**6**

COMPONENT NUMBER: PH1HP

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STATUS: Specimen V1.0

question	answers	extra information	mark
8(a)	the observed wavelength of the dark line from the distant galaxy has increased		1
	therefore the distant galaxy must be moving away from the Earth		1
	suggesting the Universe is expanding outwards from a small initial point		1
8(b)	existence of cosmic microwave background radiation	accept existence of CMBR	1
Total			**4**

COMPONENT NUMBER: PH1HP

COMPONENT NAME: GCSE Science A Physics 1H

STATUS: Specimen V1.0

question	answers	extra information	mark
9(a)	the marbles model / act as molecules	accept atoms / particles for molecules	1
	molecules leaving a liquid = evaporation **or** marbles leaving tray = evaporation		1
9(b)	to evaporate the alcohol requires energy		1
	this energy is taken from the skin and the skin feels cold	accept heat for energy	1
9(c)	there are attractive forces between molecules		1
	only the fastest molecules have enough energy to break away from other molecules		1
	these molecules escape from the surface of the liquid		1
	therefore the average speed / energy of the remaining molecules goes down		1
	the lower the average speed / energy of molecules the lower the temperature of the liquid		1
Total			**9**