



Rewarding Learning

**General Certificate of Secondary Education
2018**

Double Award Science: Physics

Unit P2

Foundation Tier

[GSD61]

FRIDAY 15 JUNE, MORNING

**MARK
SCHEME**

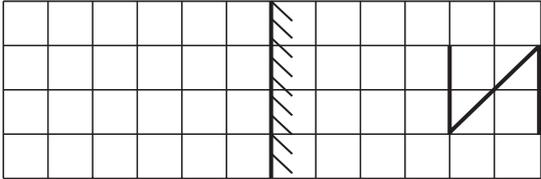
Subject-specific Instructions

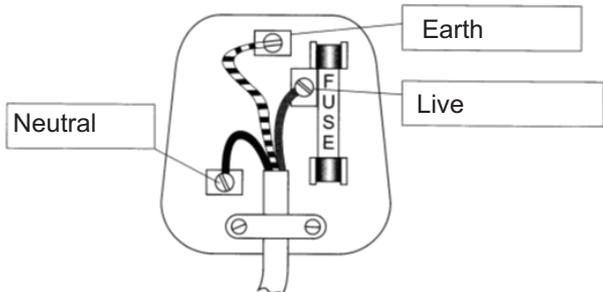
In numerical problems, the marks for the intermediate steps shown in the mark scheme are for the benefit of candidates who do not obtain the final correct answer. A correct answer and unit, if obtained from a valid starting-point, gets full credit, even if all the intermediate steps are not shown. It is not necessary to quote correct units for intermediate numerical quantities.

Note that this “correct answer” rule does not apply for formal proofs and derivations, which must be valid in all stages to obtain full credit.

Do not reward wrong physics. No credit is given for consistent substitution of numerical data, or subsequent arithmetic, **in a physically incorrect equation.** However, answers to subsequent stages of questions that are consistent with an earlier incorrect numerical answer, and are based on physically correct equation, must gain full credit. Designate this by writing **ECF** (Error Carried Forward) by your text marks.

The normal penalty for an arithmetical and/or unit error is to lose the mark(s) for the answer/unit line. Substitution errors lose both the substitution and answer marks, but 10^n errors (e.g. writing 550 nm as 550×10^{-6} m) count only as arithmetical slips and lose the answer mark.

- | | | AVAILABLE MARKS |
|----------|-----------------------------------------------------------------------------------------------------------------|-----------------|
| 1 | (a) Energy [1] | [1] |
| | (b) Amplitude = 2(m) [1]
Wavelength = 4(m) [1] | [2] |
| | (c) (i) Frequency = number of waves in 1 second [1]
$f = 50/20$
$= 2.5$ [1] Hz [1] | [3] |
| | (ii) $v = f \times \lambda$ [1]
$v = 2.5 \times 2$ [1] ecf from (c)(i)
$v = 5$ (cm/s) [1] | [3] |
| 2 | (a) Visible [1] Microwaves [1] Radio [1] | [3] |
| | (b) (i) Transverse [1] | |
| | (ii) Can travel through space/a vacuum [1] | |
| | (iii) Gamma [1] | [3] |
| | (c) (i) See bones [1] | |
| | (ii) Cancer [1] | [2] |
| | (d) dis = speed \times time [1]
dis = 1500×5 [1]
dis = 7500 [1] (m)
d = 3750 [1] (m) | [4] |
| 3 | (a) same distance [1] same size [1] and laterally inverted [1] | [3] |
| |  | |
| | (b) (i) (Speed) decreases [1] | |
| | (ii) Dispersion [1] | |
| | (iii) Spectrum [1] | |
| | (iv) Violet [1] | [4] |
| | | 9 |
| | | 12 |
| | | 7 |

		AVAILABLE MARKS
4	(a) (i) friction	[1]
	(ii) electrons [1] move from comb [1] or electrons [1] move to hair [1]	[2]
	(b) Like charges [1] repel [1]	[2]
	(c) a spark [1] could lead to a fire/explosion [1]	[2]
(d)	$I = \frac{Q}{t}$ [1]	
	$= \frac{750}{5 \times 60}$ [2]	
	$= 2.5$ [1] (A)	[4]
		11
5	(a) Switch [1] Lamp/bulb [1] Var. resistor/rheostat [1]	[3]
	(b) B, C, D, A [1] each	[4]
	(c) $V = I R$ [1] $= 0.5 \times 6$ [1] $= 3$ (V) [1]	[3]
		10
6	(a) 3 (A), 1.5 (A), 1.5 (A) [1] each	[3]
	(b) $R = \text{prod/sum}$ [1] $= 5$ (Ω) [1] or $1/R = 1/R_1 + 1/R_2$ [1] $R = 5$ (Ω) [1]	[2]
	(c) $V_1 = 3$ (V) $V_2 = 3$ (V) [1] each	[2]
	(d) (i)	
		[3]
	(ii) Earth	[1]
	(iii) Blue	[1]
	(iv) 0	[1]
		13

- 7 (a) (i) Coil, magnet [1] each [2]
 (ii) Reverses direction [1] periodically [1] [2]
 (b) (i) (Voltage) stepped up [1]
 (ii) Reduce energy lost [1] [2]
 (c) (i) (Voltage) stepped down [1]
 (ii) Produce a safe level [1] [2]

- 8 (a) Heliocentric [1]
 Geocentric [1]
 Sun [1] linked to Heliocentric
 Earth [1] linked to Geocentric
 Heliocentric [1] linked to modern theory
 Gravity [1] [6]

Response	Marks
Candidates explain 5 or 6 of the above points. They use good spelling, punctuation and grammar. The form and style are of a high standard and specialist terms are used appropriately.	[5]–[6]
Candidates explain 3 or 4 of the above points. They use satisfactory spelling, punctuation and grammar. The form and style are of a satisfactory standard and they have made use of some specialist terms.	[3]–[4]
Candidates explain 1 or 2 of the above points. They use limited spelling, punctuation and grammar. The form and style are of a limited standard and they have made no use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

- (b) asteroids [1] comets [1] [2]

AVAILABLE
MARKS

8

8

9	(i) 1 (4) 9 16 25 [$\frac{1}{2}$] each round up	[2]	AVAILABLE MARKS
	(ii) Scale at least half [1] Labels with units [1]	[2]	
	(iii) (4, 2) [1] 2 correct points [1]	[2]	
	(iv) Best fit line (for their plots) [1]	[1]	
	(v) Yes ticked (no marks) St. line [1], through origin [1] or const. gradient	[2]	
	(vi) leading to $v^2 = 20$ [1] $v = \sqrt{20}$ [1] $v = 4.5$ [1]	[3]	
	Total		12
			90