



*Rewarding Learning*

**General Certificate of Secondary Education  
2015**

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**Double Award Science: Physics**

Unit P2

Higher Tier

**[GSD62]**

**FRIDAY 12 JUNE, AFTERNOON**

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**MARK  
SCHEME**

## General Marking Instructions

### Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

### The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

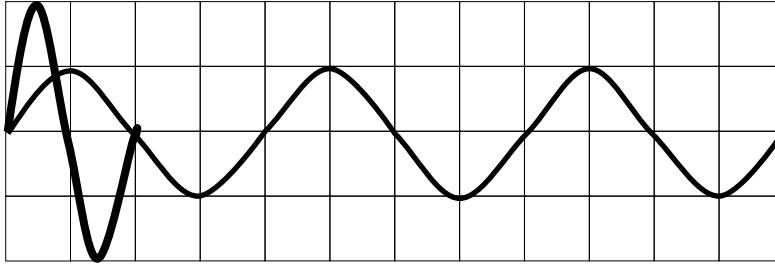
The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

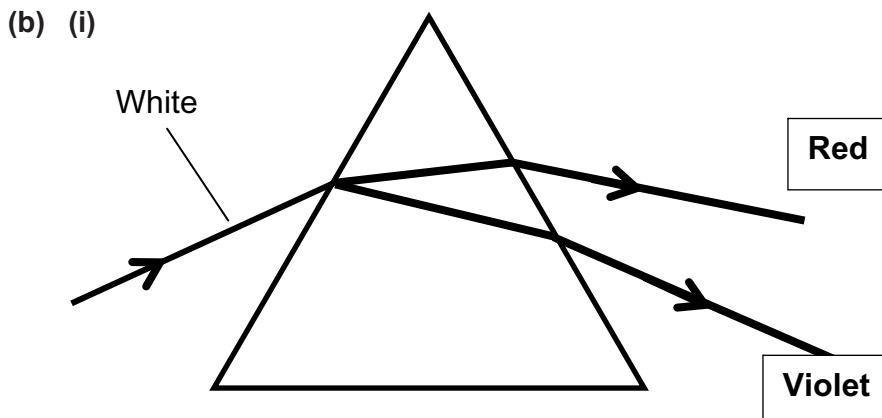
It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

- 1 (a) (i) 3 (cm) [1]
- (ii)  $f = 1/T$  or equivalent [1]  
 Frequency =  $1/0.4$  [1] Frequency = 2.5 (Hz) [1] [3]
- (iii) Correct amplitude [1] correct frequency [1] [2]  
 Negative sine or cosine wave acceptable



- (b) Horizontally or backwards and forwards or left and right [1]
- (c) { Speed = frequency  $\times$  wavelength (or symbols) } [1]  
 { Wavelength = Speed/frequency }  
 $= 3.0 \times 10^8 / 1.5 \times 10^{10}$  [1]  
 $= 2 \times 10^{-2}$  (m) [1]  
 or 0.02 (m) [3]

- 2 (a) (i) Position of vertical line [1] laterally inverted [1] same size [1] [3]  
 Independent marking
- (ii) New distance of F from mirror = 0.5 (m) [1]  
 Distance of F to image =  $0.5 \times 2 = 1.0$  (m) [1] [2]



- Both correct refractions **inside** prism [1] } D.M. Hierarchical Marking  
 Both correct refractions **outside** prism [1] } [3]  
 Both correct labels inside or outside [1]
- (ii) Travel at different speeds or red travels faster than violet [1]

AVAILABLE MARKS	
10	
9	

- 3 (a) (i) Mars and Jupiter [mark independently] [2]  
 (ii) **Two** from Mercury, Venus, Earth, Mars [1] each [2]  
**Two** from Jupiter, Saturn, Neptune, Uranus [1] each [2] [4]  
 (iii) comets, asteroids [1] each [2]  
 (iv) Gravity [1]  
 (b) (i) geocentric [1]  
 (ii) Earth [1]  
 (iii) Heliocentric [1]

- 4 (i) Scale at least half [1] correct label with unit [1] [2]  
 (ii) plot points, 6 or 7 correct [2], 4 or 5 correct [1] [ $\pm 1$  square] [2]  
 (iii) points joined in a curve [1]  
 "Point to Point" gets [0]/[1]  
 (iv) (reached) room temperature [1]  
 (v) Temp. or it decreases [1] to a constant value [1] Dependent marking [2]  
 (vi) 36(°C)–40(°C) [1]

- 5 **Five** points from:  
 Big Bang [1]  
 Explosion [1] or "singularity"  
 12–15 billion years ago [1]  
 Light from other galaxies [1]  
 Shifted to the red end of the spectrum [1]  
 Space expanding [1] or universe expanding or distance between galaxies increasing  
 Reject: galaxies moving away  
 Reject: distance between stars increasing

Response	Marks
Candidates explain <b>5 or 6</b> 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 <b>3 or 4</b> 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 <b>1 or 2</b> of the 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]

[6]

AVAILABLE  
MARKS

12

9

6

- 6 (a) (i) (Clouds) rub together/friction [1]  
(ii) Lightning [1]  
(iii) Put a lightning **conductor** on the tower/use a conducting path [1]
- (b)  $Q = It$  or equivalent [1]  
 $= 0.02 [1] \times 5 \times 60 [1]$  or  $0.02 [1] \times 300 [1]$   
 $= 6 \text{ (C) [1]}$  [4]
- (c) (i) Length is constant [1]  
(ii) All products = 12 [1]  
(iii) (Area (of cross section) is)  
**INVERSELY PROPORTIONAL** (to resistance)  
**or**  $R \times A = \text{constant}$  [1]  
(iv)  $8(\Omega)$  [1]

AVAILABLE  
MARKS

11

7 (a) (i)

SWITCH		Resistance between X and Y (in $\Omega$ )
A	B	
Open	Open	<b>9</b>
Closed	Open	<b>7</b>
Open	Closed	<b>5.4</b>

[1] for each correct answer [3]

(ii)  $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$  [1]

$= \frac{1}{12} + \frac{1}{6} + \frac{1}{4}$  or  $\frac{6}{12}$  or  $\frac{1}{2}$  [1]

$R = 2$  [1]

$R_{\text{Total}} = 5 (\Omega)$  [1] [4]

**or**

$R = \frac{\text{Product}}{\text{sum}}$  [1]

$R = 4(\Omega)$  [1]

$R = 2(\Omega)$  [1]

$R = 5(\Omega)$  [1]

(b) (i)  $3\Omega - 0.2A [1]$   $6\Omega - 0.1A [1]$  [2]

(ii)  $V = IR [1]$   $V = 0.3 \times 4 [1]$   $V = 1.2 \text{ V} [1]$  [3]

(iii) Power =  $V \times I$  or  $P = I^2R$  or  $P = \frac{V^2}{R}$  [1]

Power =  $1.2 \times 0.3$  **ecf** for V from (ii) [1]

Power =  $0.36 \text{ W}$  [1] [3]

15

8 (a)	PROCEDURE	OBSERVATION
	S pole of magnet enters the coil	Momentary deflection to the left
	S pole of magnet leaves the coil	(Momentary) deflection to the <b>right</b>
	N pole of magnet enters the coil	(Momentary) deflection to the <b>right</b>
	N pole of magnet leaves the coil	(Momentary) deflection to the <b>left</b>

[1] for each correct answer [3]

(b) (i) Decreases/step-down/less/weakens (the current) [1]  
Ignore reference to voltage

(ii) Reduces the voltage/makes the voltage safer [1]

(iii) **Electrons** collide with **atoms** or ions in the wire [1]

(c)  $\frac{N_S}{N_P} = \frac{V_S}{V_P}$  [1]     $\frac{N_S}{1800} = \frac{36}{240}$  [1]     $N_S = 270$  turns [1] [3]

9 (a) **A** Crust    **B** Mantle    **C** Inner Core [1] each [3]

(b) Plates move [1]  
Plates stick [1]  
Plates lurch/jerk/any sudden movement [1]

plates move [1]  
plates/rocks melt [1] molten rock  
magma (released) [1]  
magma = lava

Response	Marks
Candidates explain <b>5 or 6</b> 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]
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Response not worthy of credit.	[0]

[6]

**Total**

AVAILABLE  
MARKS

9

9

**90**