



**General Certificate of Secondary Education
2024**

Physics

Practical Skills Assessment

Unit 3

Booklet B

Foundation Tier

[GPY32]

MONDAY 24 JUNE, MORNING

MARK SCHEME

General Marking Instructions

Introduction

Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for GCSE Physics

Candidates must:

- AO1** Demonstrate knowledge and understanding of scientific ideas, scientific techniques and procedures;
- AO2** Apply knowledge and understanding of scientific ideas, scientific enquiry, techniques and procedures; and
- AO3** Analyse information and ideas to interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking Calculations

In marking answers involving calculations, examiners should apply the 'own figure rule' so that candidates are not penalised more than once for a computational error.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

Levels of response

Tasks and questions requiring candidates to respond in extended writing are marked in terms of levels of response. In deciding which level of response to award, examiners should look for the 'best fit' bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement. The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

Quality of written communication

Quality of written communication (QWC) is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level A: Quality of written communication is excellent.

Level B: Quality of written communication is good.

Level C: Quality of written communication is basic.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

Level A (Excellent): The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread and accurate use of appropriate specialist vocabulary. Presentation and spelling, punctuation and grammar (SPG) are of a sufficiently high standard to make meaning clear.

Level B (Good): The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation and spelling, punctuation and grammar (SPG) are sufficiently competent to make meaning clear.

Level C (Basic): The candidate makes only a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation and spelling, punctuation and grammar (SPG) may be such that intended meaning is not clear.

- 1 (a) (i) Measuring cylinder [1]
- (ii) Read at eye level or to bottom of meniscus [1] [2]
- (b) (i)
- | Quantity | Dependent | Independent | Controlled |
|------------------|-----------|-------------|------------|
| Mass of liquid | ✓ | | |
| Volume of liquid | | ✓ | |
| Type of liquid | | | ✓ |
- [3]
- (ii) X axis volume/cm³ [1]
 Y axis Mass /gLabels [1]
 5 points [$\frac{1}{2}$] each round down [2]
 Best fit line [1]
- (iii) Mass of measuring cylinder is the intercept on y axis.
 mass = 40 [2] 38, 39, 41, 42 [1]
 consistent with candidate graph
 using $y = mx + c$
 substitution of values [2]
- (iv) Mass of liquid $80 - 40 = 40$ g ecf (iii) [1]
 or any corresponding mass and volume values
 Density = mass/volume [1]
 $= 40/50$ [1]
 $= 0.8$ [1] [14]
 Or Gradient of line = $\frac{(80 - 40)}{50} = 0.8$
- (c) (i) length × breadth × depth [1]
- (ii) $D = 570/50$ [1]
 $= 11.4$ (g/cm³) [1]
- (iii) $V = M/D$ (re-arrangement mark) [1]
 $= 342/11.4$ [1]
 $= 30$ cm³ [1] [6]
 allow ecf for density

AVAILABLE
MARKS

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2	(a)	metre stick/50cm rule/ruler balance/scales	[1]		[2]	AVAILABLE MARKS
			[1]			
(b)	(i)	W = mg	[1]			
		W = 58 × 10 or g	[1]			
		W = 580	[1]			
		N [1] stand alone	[1]			
		Weight = 58 on answer line with no working [1]				
(b)	(ii)	2 × 125 = 250 mm	[1]			
		= 0.25 m	[1]			
(b)	(iii)	Work = 580 × 0.25	[1]			
		= 145	[1]			
		ecf from (i) and (ii)				
(b)	(iv)	Work = 50 × 145	[1]			
		= 7250 (J)	[1]			
		ecf from (iii)				
(b)	(v)	Power = work/time				
		= 7250/25	[1]			
		= 290	[1]			
		W	[1]	[13]		
(c)	Repeat and average		[1]	[1]		
						16

	AVAILABLE MARKS
<p>3 (a) (i) Incident ray 30° from the normal with inward arrow independent provided on same side of mirror [2]</p> <p>(ii) Reflected ray 30° from the normal with outward arrow independent provided on same side of mirror [2] [4]</p>	
<p>(b) (i) An image that light only appears to come from or An image that cannot projected on to a screen or Rays do not pass through image [1]</p> <p>(ii) The marked in the correct position behind the mirror not X – [1]/[2] [2]</p> <p>(iii) Ray 3 threshold [1] Evidence of extrapolation back to image Or one ray from object to ray 3 [1] [5]</p>	
<p>(c) (i) Path of ray inside glass block [1]</p> <p>(ii) Angles of incidence and refraction [2]</p> <p>(iii) Labels on both axes, Y-axis D/cm, X-axis $i/^\circ$ [1] Six points including the origin $[\frac{1}{2}]$ each round up [3] Line of best fit [1] Poor scale i.e. less than half to grid (deduct [1]) Transposed axes (deduct [1])</p> <p>(iv) Yes [1] Straight line through origin [1] [10]</p>	19

				AVAILABLE MARKS
4	(a)	R = V/I	[1]	
		= 2.6/1.2	[1]	
		= 2.16 Ω	[1] [3]	
	(b) (i)	Correct symbols	[1]	
		Two bulbs in series	[1]	
	(ii)	X-axis (number of) bulbs	[1]	
		Y-axis current/A or I/A	[1]	
	(iii)	The graph is a curve or is not a straight line or is not a straight line passing through 0,0	[1]	
	(iv)	Current = 0.2 - ignore d.p. requirement	[1]	
	(v)	Reading current from graph = 0.19		
		R = 3.2/0.2 [1]	[1]	
		= 16 [1]	[1]	
	(vi)	R for 1 bulb = 16/4 [1]	[1]	
	= 4 [1]	[1]		
	ecf from (v) (v/4)	[10]		
			Total	13
				70