Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICS **0625/06**

Paper 6 Alternative to Practical **For examination from 2023**

MARK SCHEME

Maximum Mark: 40

Specimen

This document has **10** pages. Any blank pages are indicated.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

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GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	<u>'List rule' guidance</u> For questions that require ***n*** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards ***n***. • Incorrect responses should not be awarded credit but will still count towards ***n***. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response. • Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

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6	<u>Calculation specific guidance</u> Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'. For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values. For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme. Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.
7	<u>Guidance for chemical equations</u> Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme. State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

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Abbreviations and guidance

/	Alternative answers for the same marking point.
underline	Actual word underlined must be used by candidate (grammatical variants accepted).
(brackets)	The word or phrase in brackets is not required but sets the context.
AND / and	Statements on both sides of the **AND** are needed for that mark.
OR / or	Indicates alternative answers, any one of which is satisfactory for scoring the marks.
NOT / not	Indicates that an incorrect answer is not to be disregarded but cancels another otherwise correct alternative offered by the candidate for this mark.
Accept / Acc	A less than ideal answer which should be marked correct.
Ignore / Ig	Indicates that something which is not correct or irrelevant is to be disregarded.
e.c.f.	'error carried forward'
o.w.t.t.e.	'or words to that effect'
s.f.	'significant figures' – answers are normally acceptable to any number of significant figures $\geqslant 2$. Any exceptions to this general rule will be specified in the mark scheme.
Arithmetic errors	If the **only** error in arriving at a final answer is clearly an arithmetic one, all but the final **A** mark can be awarded. Regard a power of ten error as an arithmetic error.
Transcription errors	If the **only** error in arriving at a final answer is because given or previously calculated data has clearly been misread but used correctly, all but the final **A** mark can be awarded.
Fractions	Only accept these where specified in the mark scheme.
Crossed-out work	Work which has been crossed out and not replaced but can easily be read, should be marked as if it had not been crossed out.

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Question	Answer	Marks
1(a)	21(.0) (°C)	**1**
1(b)	s, °C, °C all correct	**1**
	30, 60, 90, 120, 150, 180	**1**
1(c)	appropriate precaution, e.g. avoidance of parallax (only if explained) / wait until reading stops rising (at start)	**1**
1(d)(i)	beaker with lid **A** (has a greater rate of cooling)	**1**
	correct mention of comparative temperature change <u>over 0 to 180 s</u>	**1**
1(d)(ii)	any suitable change to <u>apparatus</u> relating to comparison, e.g. insulate sides / stand on mat use plastic beaker thicker lid use of fan use wider beaker	**1**
	matching valid explanation, e.g. thermal energy only escapes from surface less transfer of thermal energy by sides / bottom less conduction through lid larger surface area (for evaporation to occur)	**1**
1(e)	straight line	**1**
	through the origin	**1**
1(f)	any appropriate factor, e.g. volume of water initial temperature of water (same) lids type / material / size of beaker room temperature / appropriate environmental factor	**1**

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Question	Answer	Marks
2(a)(i)	correct voltmeter symbol in parallel with **P** and **Q**	**1**
2(a)(ii)	V = 2.6 (V)	**1**
	I = 0.36 (A)	**1**
2(b)	correct units: V, A	**1**
2(c)(i)	correct calculations of R: $\frac{7.2}{\textbf{e.c.f.}}$, 5.1, 3.1 (Ω)	**1**
	consistent 2 or consistent 3 **s.f.**	**1**
2(c)(ii)	correct calculations of $\frac{R}{l}$: $\frac{0.080}{\textbf{e.c.f.}}$, 0.085, 0.078	**1**
2(d)	statement matching results <u>with</u> values quoted **AND** matching justification (e.g. 'within the limits of experimental accuracy')	**1**
2(e)	any **one** from: difficult to judge position of crocodile clip difficult to measure wire to nearest mm contact between wire and crocodile clip not precise difficult to interpolate readings on meters between graduations	**1**
2(f)(i)	in series between power supply and either voltmeter terminal	**1**
2(f)(ii)	correct symbol for variable resistor (rectangle with strike-through arrow only)	**1**

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Question	Answer	Marks
3(a)	h_O = 1.4 (cm)	**1**
3(b)	h_I present (EXPECT 4.5 cm) **AND** *M* calculation correct (EXPECT $\frac{0.31}{\textbf{e.c.f.}}$ from h_O and h_I)	**1**
	M to 2 **s.f. NOT** use of recurring symbol	**1**
3(c)	axes with correct orientation, both labelled with quantity and unit	**1**
	appropriate scales (plots occupying at least ½ grid)	**1**
	plots all correct to ½ small square and precise plots	**1**
	well-judged line and thin line	**1**
3(d)	*G* in range 15.0 to 17.0	**1**
	triangle method seen on graph occupying at least half of line	**1**
3(e)	any inherent difficulty, e.g. hand / ruler in way of image **OR** some images too small to measure accurately	**1**
	matching improvement to <u>apparatus</u>, e.g. use translucent screen and view from behind **OR** fix ruler / grid to screen **OR** mark extremities of image and measure later **OR** use larger object	**1**

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Question	Answer	Marks
4	MP1 **factor:** clear statement of appropriate variable to test, e.g. mass of ball	**1**
	MP2 **control variable:** named variable which should be kept constant, e.g. height of drop, depth of sand	**1**
	MP3 **apparatus:** metre rule and any apparatus essential to variable under test, e.g. balance	**1**
	MP4 **method:** measure factor under test **AND** drop ball **AND** measure diameter / depth of depression	**1**
	MP5 repeat for new value of variable under test	**1**
	MP6 **additional point:** repeat experiment or each value of factor **AND** average / means of measuring depth / diameter of crater accurately / apparatus for measuring diameter of ball accurately / measure diameter of ball / crater in different places (and take mean) / smooth / flatten sand surface / at least 5 sets of data taken / reliable means of releasing ball / sensible values for factor quoted	**1**
	MP7 **graph:** diameter / depth of depression vs appropriate <u>continuous</u> variable (**NOT** 'size' of ball without qualification)	**1**

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