

Cambridge IGCSE™

CO-ORDINATED SCIENCES**0654/32**

Paper 3 Theory (Core)

October/November 2025

MARK SCHEME

Maximum Mark: 120

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **18** printed pages.

PUBLISHED**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 descriptions 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).

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 'List rule' guidance

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.

6 Calculation specific guidance

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 Guidance for chemical equations

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.

Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	correct point or mark awarded
	incorrect point or mark not awarded
BOD	benefit of the doubt given
FT	follow through
TV	response is too vague or there is insufficient detail in response
ECF	error carried forward applied
	information missing or insufficient for credit
	unclear response
I	incorrect or insufficient point ignored while marking the rest of the response
R	incorrect point or mark not awarded

Annotation	Meaning
LNK	two statements are linked
SEEN	point has been noted, but no credit has been given or blank page seen
	key point attempted / working towards marking point / incomplete answer / response seen but not credited / blank page seen
BP	blank page

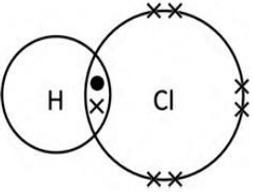
Question	Answer	Marks
1(a)(i)	A – stomach ; C – large intestine ; E – gall bladder ;	3
1(a)(ii)	undigested ; <u>faeces</u> ;	2
1(a)(iii)	insulin ;	1
1(b)(i)	(heat with) Benedict's (solution) ; (starting colour) blue ; (final colour) red / orange / yellow / green ;	3
1(b)(ii)	water + (carbon dioxide) → oxygen + glucose 1 mark left hand side correct 1 mark right hand side correct	2

Question	Answer	Marks
1(b)(iii)	<p>Diffusion is described as the net movement of particles. <input checked="" type="checkbox"/></p> <p>Diffusion is the result of random movement of particles. <input checked="" type="checkbox"/></p> <p>Diffusion is the movement of particles from a lower to higher concentration. <input type="checkbox"/></p> <p>Diffusion is the movement of particles up a concentration gradient. <input type="checkbox"/></p> <p>In diffusion the particles always move through a partially permeable membrane. <input type="checkbox"/></p> <p>1 mark for each correct answer</p> <p>3 boxes ticked – 2 correct – 1 mark 3 boxes ticked – 1 correct – 0 marks 4 boxes ticked – 0 marks</p>	2

Question	Answer	Marks
2(a)	competition ; survived ; alleles ;	3
2(b)(i)	any one from: <ul style="list-style-type: none"> • increased area for housing ; • crop plant production ; • livestock production ; • extraction of natural resources ; • freshwater and marine pollution ; • AVP ; 	1
2(b)(ii)	any two from: <ul style="list-style-type: none"> • reducing biodiversity ; • extinction ; • loss of soil ; • flooding ; • increase of carbon dioxide in the atmosphere ; 	2
2(b)(iii)	any two from: <ul style="list-style-type: none"> • method of monitoring species / method of protecting species ; • education ; • captive breeding programmes ; 	2

Question	Answer	Marks													
3(a)(i)	P – rib ; Q – alveolus / alveoli ;	2													
3(a)(ii)	diaphragm labelled D ;	1													
3(a)(iii)	oxygen ;	1													
3(a)(iv)	any two from: <ul style="list-style-type: none"> • muscle contraction ; • protein synthesis ; • cell division ; • growth ; • the passage of nerve impulses ; • the maintenance of a constant body temperature ; 	2													
3(b)(i)	trachea / bronchi ;	1													
3(b)(ii)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2" rowspan="2"></td> <td colspan="2" style="text-align: center;">mother's genotype</td> </tr> <tr> <td style="text-align: center;">F</td> <td style="text-align: center;">f</td> </tr> <tr> <td rowspan="2" style="text-align: center; vertical-align: middle;">father's genotype</td> <td style="text-align: center;">F</td> <td style="text-align: center;">FF</td> <td style="text-align: center;">Ff</td> </tr> <tr> <td style="text-align: center;">f</td> <td style="text-align: center;">Ff</td> <td style="text-align: center;">ff</td> </tr> </table> <p>father's genotype correct ; offsprings' genotype correct ;</p>			mother's genotype		F	f	father's genotype	F	FF	Ff	f	Ff	ff	2
				mother's genotype											
		F	f												
father's genotype	F	FF	Ff												
	f	Ff	ff												
3(b)(iii)	heterozygous and has two different <u>alleles</u> ;	1													

Question	Answer	Marks
4(a)(i)	giraffe / elephant / zebra ;	1
4(a)(ii)	cheetah / lion / hyena ;	1
4(a)(iii)	4 ;	1
4(b)	E ; G ; B ;	3
4(c)	oxygen ; suitable temperature ; water ;	3

Question	Answer	Marks
5(a)(i)	He ;	1
5(a)(ii)	CO ;	1
5(a)(iii)	N ₂ ;	1
5(a)(iv)	He or N ₂ or O ₂ ;	1
5(a)(v)	O ₂ ; H ₂ O ;	2
5(b)	 <p>shared pair correct ; all else correct ;</p>	2

Question	Answer	Marks
5(c)	turns red ;	1
5(d)	hydrogen ; oxygen ;	2

Question	Answer	Marks
6(a)	single and double ;	1
6(b)	$ \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array} $ carbon – carbon single bond ; all else correct ;	2
6(c)	24 + 6 or 2 × 12 + 6 × 1 ; 30 ;	2
6(d)(i)	blue ; (to) pink ;	2
6(d)(ii)	pure water boils at 100 °C ; impurities increase boiling point / AW ;	2

Question	Answer	Marks
6(d)(iii)	planting trees / planting plants ; CO ₂ removed by trees / CO ₂ removed by plants ; OR reduction in livestock farming ; less CO ₂ emitted / less methane emitted ; OR decreasing use of fossil fuels ; less CO ₂ produced (during combustion) ; OR increasing use of hydrogen / increasing use of renewables ; no CO ₂ produced ;	2

Question	Answer	Marks
7(a)(i)	<u>alloy</u> ;	1
7(a)(ii)	3 magnesium atoms out of 20 total or 3 / 20 ; 15(%) ;	2
7(b)	sodium or magnesium or potassium ; more reactive than carbon / higher than carbon in the reactivity series ;	2

Question	Answer	Marks
7(c)	<p>W magnesium</p> <p>X zinc</p> <p>Y iron</p> <p>Z copper</p> <p>magnesium and copper correct – 1 mark zinc and iron correct – 1 mark</p>	2
7(d)(i)	<p>magnesium + (hydrochloric acid) → magnesium chloride + hydrogen</p> <p>all three correct – 2 marks one or two correct – 1 mark</p>	2
7(d)(ii)	aqueous or (in) solution or dissolved in water ;	1

Question	Answer	Marks
8(a)(i)	eight electrons added to outer shell ; – sign shown ;	2
8(a)(ii)	<p>generally soluble in water <input checked="" type="checkbox"/></p> <p>good electrical conductivity <input type="checkbox"/></p> <p>high melting point <input checked="" type="checkbox"/></p> <p>low melting point <input type="checkbox"/></p> <p>poor electrical conductivity <input checked="" type="checkbox"/></p> <p>2 correct – 1 mark all 3 correct – 2 marks</p>	2

Question	Answer	Marks
8(b)	(pale) yellow-green ; gas ;	2
8(c)	hydrochloric acid ; sodium hydroxide ;	2

Question	Answer	Marks
9(a)(i)	correct symbol for battery and switch ; series connections ;	2
9(a)(ii)	$V = 4 \times 1.5$ OR 6.0 (seen) ; $R = V / I$ (in any form) OR 6(.0) / 3(.0) ; 2.0 (Ω) ;	3
9(b)(i)	helium nucleus / 2 protons and 2 neutrons ;	1
9(b)(ii)	decay rate needs to remain constant / AW ;	1
9(b)(iii)	146 ;	1

Question	Answer	Marks
10(a)	<u>convection</u> ;	1
10(b)	(gas is diagram) C and (liquid is diagram) B ;	1
10(c)(i)	$P = IV$ (in any form) OR (current =) $3000 / 240$; 12.5 (A) ;	2
10(c)(ii)	energy = power \times time (in any form) ; conversion of minutes to hours ; conversion of W to kW ; (= 0.5 kWh)	3
10(c)(iii)	(\$) 0.25 ;	1
10(d)	insulation damaged / exposed (live) wire / AW ; electric shock ;	2

Question	Answer	Marks
11(a)(i)	evidence of total time = 15 (s) ; $v = s / t$ (in any form) OR (average speed =) 100 / 15 ; 6.7 (m / s) ;	3
11(a)(ii)	$P = W / t$ (in any form) OR (work done =) 600 × 3.0 ; 1800 ; J ;	3
11(b)(i)	<u>evaporation</u> ;	1
11(b)(ii)	white absorbs less (thermal) <u>radiation</u> / white reflects more (thermal) <u>radiation</u> / ORA ;	1
11(b)(iii)	helium or hydrogen ;	1
11(b)(iv)	infrared (visible) light ultraviolet 1 or 2 correct – 1 mark all 3 correct – 2 marks	2

Question	Answer	Marks
12(a)(i)	D ;	1
12(a)(ii)	weight is the gravitational force on an object that has mass / definition of mass (not weight) ;	1
12(a)(iii)	2000 (N) and (constant speed so) no resultant force ;	1
12(b)(i)	decreases ;	1
12(b)(ii)	decreases ;	1
12(c)(i)	battery ;	1
12(c)(ii)	8 (A) ; current in main part of circuit is greater than current in either branch ;	2
12(c)(iii)	full voltage across both lamps OR if one lamp fails, the other will still work / AW ;	1
12(d)	any two from: <ul style="list-style-type: none"> • same size ; • same distance from mirror ; • laterally inverted ; 	2