

Cambridge IGCSE™

MARINE SCIENCE**0697/21**

Paper 2 Theory and Practical Skills

May/June 2025**MARK SCHEME**

Maximum Mark: 80

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 May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **17** printed pages.

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
	correct point or mark awarded from marking point 1 similar numbered ticks are used for marking point 2, 3, 4 etc.
	incorrect point or mark not awarded
	information missing or insufficient for credit
	incorrect or insufficient point ignored while marking the rest of the response
	benefit of the doubt given
	benefit of doubt was considered, but the response was decided to not be sufficiently close for benefit of doubt to be applied
	error carried forward applied
	contradiction in response, mark not awarded
	incorrect point or point rejected

Annotation	Meaning
	key point attempted / working towards marking point / incomplete answer / response seen but not credited / blank page seen
	point has been noted, but no credit has been given or blank page seen
	used to highlight parts of an extended response
	used to highlight parts of an extended response

Mark scheme abbreviations

- ; separates marking points
- / alternative responses for the same marking point
- **R** reject the response
- **A** accept the response
- **I** ignore the response
- ecf error carried forward
- AVP any valid point / alternative valid point
- ORA or reverse argument
- AW alternative wording
- underline actual word given must be used by candidate (grammatical variants excepted)
- () the word / phrase in brackets is not required but sets the context
- OR separates two different routes to a mark point and only one should be awarded
- **MP** marking point
- max indicates the maximum number of marks that can be given

Question	Answer	Marks
1(a)	<p><i>any 2 from:</i></p> <p>1 bilateral symmetry ; 2 exoskeleton ; 3 compound eyes ; 4 <u>two pairs</u> of antennae ; 5 abdominal segments <u>with</u> jointed legs ;</p>	2
1(b)(i)	protein / carbohydrates / vitamins / minerals ;	1
1(b)(ii)	<p><i>any 3 from:</i></p> <p>1 grind up the sample / AW ; 2 add alcohol / ethanol ; 3 stir / mix / shake / AW ; 4 add water AND, white / emulsion, forms ;</p>	3
1(b)(iii)	<p><i>any 2 from:</i></p> <p>insulation ; energy ; lipids contain vitamins ; AVP ;</p>	2

Question	Answer	Marks
2(a)(i)	measuring cylinder ;	1
2(a)(ii)	<p><i>any 2 from:</i></p> <p>1 dry beaker before weighing it / AW ;</p> <p>2 stir for set time / set number of stirs / AW ;</p> <p>3 repeat / calculate mean / AW ;</p> <p>4 measure temperature in beaker (rather than in water bath) / AW ;</p> <p>5 use <u>thermostatically controlled</u> water bath / <u>electronic</u> water bath / AW ;</p>	2
2(b)	<p><i>any 3 from:</i></p> <p>1 (as temperature increases) mass (of water) decreases (more) / AW ;</p> <p>2 because the carbon dioxide is less soluble / less solubility / AW ;</p> <p>3 more kinetic energy / AW ;</p> <p>4 more carbon dioxide released / AW ;</p>	3
2(c)	<p><i>any 3 from:</i></p> <p>1 warm water has a lower density / ORA / AW ;</p> <p>2 so warm water, rises / floats / AW / ORA ;</p> <p>3 in warm water particles have more kinetic energy / ORA ;</p> <p>4 water / particles, move more / move faster / AW / ORA ;</p> <p>5 particles are / water is, more spread out / AW / ORA;</p>	3

Question	Answer	Marks
3(a)(i)	shrimps / copepods / mackerel ;	1
3(a)(ii)	dinoflagellates, copepods, mackerel, lancetfish, tuna, shark ; correct direction of arrows ;	2
3(b)(i)	1 clear edges with no breaks and no shading ; 2 large diagram that is at least size of image ; 3 correct proportions (tail must be at least same length as body AND two points must point backwards) ; 4 three clear points attached to body ;	4
3(b)(ii)	0.27 ;; (3 marks) 0.26(6666....) ;; (2 marks) ÷360 OR 96 (mm) OR 9.6 cm ; (1 mark)	3
3(b)(iii)	protoctists ;	1
3(b)(iv)	any 1 from: microscopic / can only be seen with a microscope / AW ; single-celled ; chloroplasts present / chlorophyll ;	1

Question	Answer	Marks
3(c)(i)	<p><i>any 3 from:</i></p> <p>1 lower (Secchi) disc (into water) until it cannot be seen / AW ;</p> <p>2 record length (of rope) / mark point on rope / AW ;</p> <p>3 (after lowering it further) raise disc until it is seen AND record length of rope / mark rope (again) / AW ;</p> <p>4 calculate, mean / average, length / AW ;</p> <p>5 longer length (of rope) indicates lower population (size) / ORA / AW ;</p>	3
3(c)(ii)	<p><i>any 1 from:</i></p> <p>1 other substances / sediment may be causing cloudiness / AW ;</p> <p>2 other algal species / other organisms may affect results / AW ;</p> <p>3 the (Secchi) disc measures turbidity / cloudiness / clarity / light penetration, (not population) / AW ;</p> <p>4 idea that seeing (Secchi) disc is subjective / depends on angle of sight / AW ;</p> <p>5 light intensity may vary / AW ;</p>	1

Question	Answer	Marks
4(a)(i)	mantle ;	1
4(a)(ii)	<i>any 2 from:</i> 1 made of iron ; 2 <u>inner</u> (core) is solid ; 3 <u>outer</u> (core) is, liquid / molten ;	2
4(b)(i)	(continuous) movement of water in a <u>direction</u> / AW ;	1
4(b)(ii)	tides / density / temperature (difference) / salinity (difference) ;	1
4(c)(i)	headings with units ; data in order of day ; data correctly placed in table ;	3
4(c)(ii)	wind speed / wind direction ;	1
4(c)(iii)	<i>any 3 from:</i> measure distance <u>moved_by_float</u> / AW ; measure time taken <u>for_float_to_move</u> / AW ; calculate speed as distance \div time ; repeats to calculate mean ;	3

Question	Answer	Marks
4(c)(iv)	<p><i>any 3 from:</i></p> <p>1 (supported as) (mean) current speed increases with wind speed when wind is from NW / on days 1, 2 and 3 / AW ;</p> <p>2 <u>prevailing</u> wind is from NW / AW ;</p> <p>3 on <u>Day 4</u> wind speed, is higher than <u>Day 1</u> but (mean) current speed is, same / AW ;</p> <p>4 on <u>Day 5</u> wind speed, is higher than <u>Day 1 / Day 2</u>, but (mean) current speed is lower / AW ;</p> <p>5 on Day 4 and Day 5 wind speeds are same but (mean) current speeds are different / AW ;</p> <p>6 wind direction affects (mean) current speed / AW ;</p> <p>7 few data points with each wind direction / need more repeats / low sample size / AW ;</p>	3

Question	Answer	Marks
5(a)	<p><i>any 3 from:</i></p> <p>1 double hulls ;</p> <p>2 to reduce risk of oil leaks (after collision) / AW ;</p> <p>3 only wash out hold at special collection sites / AW ;</p> <p>4 control of sewage release / AW ;</p> <p>5 control of garbage disposal / AW ;</p>	3

Question	Answer	Marks
5(b)(i)	1 linear scales on both axes ; 2 axes labelled with units ; 3 plots correct ; 4 straight lines joining points ;	4
5(b)(ii)	(dispersal effectiveness) increases ; levels off, after ratio of 0.10 / from ratio of 0.15 / AW ;	2
5(b)(iii)	$0.05 \times 5000 = 250$; kg ;	2
5(b)(iv)	<i>any 2 from:</i> 1 increasing mass of dispersant has little effect beyond this / AW ; 2 dispersants are toxic / AW ; 3 using less (dispersant) reduces environmental impact / AW ; 4 reduces costs / AW ;	2

Question	Answer	Marks
5(c)	<p><i>up to 3 from:</i></p> <p>1 infinite source of energy / not used up / will not run out / AW ;</p> <p>2 reduces reliance on fossil fuel / less oil used / AW ;</p> <p>3 reduces carbon dioxide release / AW ;</p> <p>4 less need to transport oil / reduced risk of oil spills / less damage to seabed from drilling ;</p> <p><i>and up to 3 from:</i></p> <p>5 limited number of locations (can be used) / may not be windy / (severe) weather may damage turbines / AW ;</p> <p>6 (turbines) need cables on seabed / installations damage seabed / AW ;</p> <p>7 example of how marine life damages by turbines ;</p> <p>8 conflict with (eco)<u>tourism</u> / AW ;</p> <p>9 high startup cost/maintenance cost / AW ;</p>	4 max 4

Question	Answer	Marks
6(a)	<p><i>any 3 from:</i></p> <p>1 young / hatchlings / after hatching, move to, (open) ocean / sea ;</p> <p>2 move to feeding grounds / feed whilst at sea / AW ;</p> <p>3 idea of reduced competition for food / AW ;</p> <p>4 go to areas with fewer predators / avoid predation / AW ;</p> <p>5 move using ocean currents / AW ;</p> <p>6 become sexually mature at sea / find mates (when in water) / AW ;</p> <p>7 (females) return to sandy shores (to lay eggs) / females return to shores where they hatched / AW ;</p>	3
6(b)(i)	91 (%) ;	1
6(b)(ii)	(male =) 45 ; (female =) 455 ;	2
6(b)(iii)	<p><i>any 3 from:</i></p> <p>1 increased carbon dioxide / AW ;</p> <p>2 increased temperature / AW ;</p> <p>3 fewer males / more females / AW ;</p> <p>4 less breeding / less mating / reduced reproduction / AW ;</p> <p>5 AVP ;</p>	3

Question	Answer	Marks
6(c)	<p><i>any 6 from:</i></p> <p>1 use shores with different profiles / slopes / angles / AW ;</p> <p>2 place poles at top and bottom of area of shore / AW ;</p> <p>3 measure distance (between poles) / AW ;</p> <p>4 measure <u>angle</u> with clinometer / AW ;</p> <p>5 count nests (on shore) / determine nest numbers / AW ;</p> <p>6 use of quadrats / use of a transect (to sample area) / AW ;</p> <p>7 same time (of day) / season / time of year / AW ;</p> <p>8 same light intensity / same noise levels / AW ;</p> <p>9 idea of suitable safety measure/feature ;</p> <p>10 idea of ethical issue ;</p>	6