Cambridge Assessment International Education

Cambridge IGCSE™

MARINE SCIENCE **0697/02**

Paper 2 Theory and Practical Skills **For examination from 2024**

MARK SCHEME

Maximum Mark: 80

Specimen

This document has **10** pages.

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 descriptions for the question
- the specific skills defined in the mark scheme or in the generic level descriptions 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 descriptions.

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 descriptions 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 (see examples below) 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.

Mark schemes will use these abbreviations:

;	separates making points
/	alternatives
()	the word / phrase in brackets is not required but sets the context
A	accept (for answers correctly cued by the question, or guidance for examiners)
and	both responses required for the mark
any [number] from:	accept the [number] of valid responses
AVP	alternative valid point
AW	alternative wording (where responses vary more than usual)
ecf	error carried forward
I	ignore as irrelevant
MP	mark point
note:	additional marking guidance
ora	or reverse argument
R	reject
underline	actual word given must be used by candidate (grammatical variants accepted)

Question	Answer	Marks	Guidance
1(a)(i)	drawing suitable size ; proportions correct ; neat lines (no sketching) and no shading ; eyes **and** turned up mouth **and** operculum clearly visible ;	**4**	length of caudal fin between $\frac{1}{4}$ and $\frac{1}{3}$ of body length
1(a)(ii)	operculum correctly labelled ; caudal fin correctly labelled ;	**2**	lines touch features being labelled
1(a)(iii)	sensitivity / to detect vibrations / AW ;	**1**	
1(b)(i)	line drawn from front of head to end of caudal fin **and** measured accurately ;	**1**	Allow answers of ±0.2 cm difference
1(b)(ii)	correct magnification ; one mark for length of line divided by 25 ;	**2**	Allow ecf
1(c)	*any two from:* flattened body to lie on seabed ; eyes on top of head to detect prey / predators from above ; camouflaged body so prey / predators do not see it ; mouth turned sideways for feeding ;	**2**	

Question	Answer	Marks	Guidance
2(a)	carbon dioxide + water → glucose + oxygen ;	**1**	
2(b)	*any four from:* algal bloom occurs ; competition for light ; algae cannot photosynthesise ; algae die ; decomposition occurs ; bacteria / microbes / fungi / decomposers, respire ; using up oxygen in the water ; animals cannot respire without oxygen ;	**4**	

Question	Answer	Marks	Guidance
2(c)	*any four from:* Secchi disc / description of Secchi disc, is used ; lowered on a rope until the disc is not seen ; length of rope recorded ; disc lowered further ; raised until it is seen ; length of rope re-measured and mean length calculated ;	**4**	

Question	Answer	Marks	Guidance
3(a)(i)	biuret solution / AW ; lilac colour / AW ;	**2**	
3(a)(ii)	Benedict's solution / AW ; heat in water-bath ; red / orange / yellow / green, colour ;	**3**	
3(b)(i)	vitamins ;	**1**	
3(b)(ii)	growth / repair / cell production / AW ;	**1**	
3(b)(iii)	113 ÷ 22 = 5.13 (g of shrimp has 1 g of protein) ; 5.13 × 63 = 323.6 ; g ;	**3**	Allow ecf A answers that round to 323
3(b)(iv)	to make haemoglobin ; to transport / bind, to oxygen ;	**2**	

Question	Answer	Marks	Guidance
4(a)(i)	to avoid bias / ensure that sample is representative / AW ;	**1**	
4(a)(ii)	*any two from:* weather when fish were caught ; (geographical) area of markets ; area that fish were caught ; method of capture ; AVP ;	**2**	

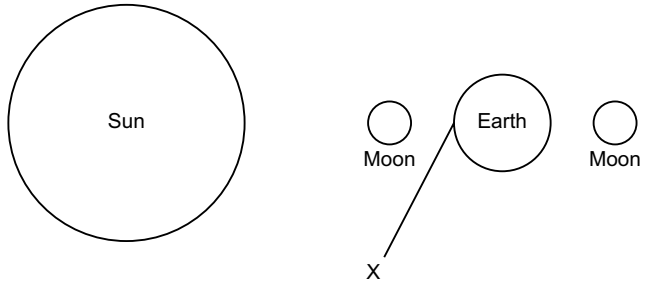
Question	Answer	Marks	Guidance
4(a)(iii)	any two correct descriptions of data ;	**2**	e.g. decrease (from 2008) ; stable length between 2005 and 2008 ;
4(a)(iv)	*any two from:* consumer demand for smaller fish ; smaller net meshes used ; different fishing method ; over fishing ; taking more juvenile fish ; AVP ;	**2**	
4(b)(i)	*any three from:* dark / no light ; little dissolved oxygen ; very stable low temperature ; very high pressure ;	**3**	
4(b)(ii)	*any three from:* bioluminescence ; attract prey ; dark brown or black colour ; to avoid detection by prey ; large mouth / backward facing teeth ; AVP ; e.g. modified dorsal fin ;	**3**	

Question	Answer	Marks	Guidance
5(a)	clear table with (ruled) lines **and** headings and units ; tabulating all the results ; distance of lamp ranked **and** data paired correctly ;	**3**	
5(b)	linear scales for both axes (data uses at least half of grid in at least one direction) ; axes labelled with units ; points plotted correctly ; points joined with straight lines (no extrapolation) ;	**4**	

Question	Answer	Marks	Guidance
5(c)	*any three from:* as distance increases rate of bubbling decreases / AW ; because light intensity decreases ; so there is less energy ; less oxygen is produced by photosynthesis ;	**3**	
5(d)	*any two from:* (mark in pairs) replicates ; to identify anomalies / calculate means / AW ; collect volume of gas ; because bubble sizes vary ; monitor / maintain temperature ; because temperature affects photosynthesis ; add sodium hydrogencarbonate ; so carbon dioxide does not run out ; AVP ;;	**4**	

Question	Answer	Marks	Guidance
6(a)	advantage: renewable energy source / no carbon dioxide release ; disadvantage: high initial cost / limited by weather / damage by storms ;	**2**	Allow localised / self-contained power source / no need for fuel or battery replacement
6(b)	*any three from:* decomposition occurs at seabed ; water is rich in, minerals / nutrients ; nitrate / magnesium ; for amino acid / chlorophyll production ;	**3**	A other correct nutrients

Question	Answer	Marks	Guidance
6(c)(i)	*any three from:* removal of carbon dioxide from atmosphere ; due to photosynthesis ; kelp are very productive / AW ; carbon dioxide is a greenhouse gas ; less reflection of heat onto planet / AW ;	**3**	
6(c)(ii)	*any two from:* increased species richness ; increased habitats for animals ; nursery / breeding areas for animals ; food / energy source for food chains ; kelp is a human food so less farming on land / loss of land ; aquaculture reduces pressure on wild kelp / reduces harvesting of wild kelp ; AVP ;	**2**	

Question	Answer	Marks	Guidance
7(a)(i)	moon drawn in straight line with Sun and Earth (Moon on either side of Earth) ;	**1**	e.g. 
7(a)(ii)	*any three from:* reference to gravity ; (in spring) pull of Moon and pull of Sun combine / AW ; exert greater force on water body ; (neap tide) the Moon is at right angles ; so there is less combined force / force pulls in different directions ;	**3**	

Question	Answer	Marks	Guidance
7(b)	*any six from:* *Independent variable* sample in July and in January ; *Dependent variable* burrows counted ; *Variables that should be kept constant* same time of day / same area of beach ; same state of time / same tidal phase ; *Apparatus and techniques* quadrats used ; random placement (of quadrats) ; method for determining random locations (of quadrats) ; replicates / calculated means ; use means to estimate total number of burrows for whole beach ; *Risks / Safety* appropriate safety precautions ;	**6**	A description of quadrats