



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate 2019

Marking Scheme

Science

Common Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

Guidelines for Examiners

1. In many cases only key phrases are given in the marking scheme. These points contain the information and ideas that must appear in the candidate's answer in order to merit the assigned marks.
2. The descriptions, methods and definitions given in a marking scheme are not exhaustive and alternative valid answers are acceptable.
3. Words, expressions or statements separated by a solidus (/) are alternatives which are equally acceptable for a particular point. Note, however, that words, expressions or phrases must be correctly used in context.
4. **Cancelled or repeated answers**
 - a. In the case of short-answer questions, if an answer is cancelled and a second answer given, the cancellation is accepted and marks are awarded for the uncanceled answer.
 - b. If more than the required number of uncanceled answers are given, surplus incorrect answers nullify the marks awarded for correct answers. (Examples of this will be given during the marking conference.)
 - c. If the only answer offered is cancelled, the cancelling is ignored and the answer marked as normal.
5. **Recording a mark of zero and recording "No Response" (NR)**

A zero should only be recorded when the candidate has attempted the question but does not merit marks.

If a candidate does not attempt a question (or part of) examiners should record NR.
6. **Application of the marking scheme**

Apply the marking scheme as agreed in all cases.
7. **Electronic annotation of responses**

Annotations should allow your Advising Examiner to understand the mark you awarded. Examiners are expected to annotate parts of the responses as directed at the marking conference. (See **JC Science 2019 – Annotations** below.)

JC Science 2019 – Annotations

Symbol	Name	Use
#	Hash (Star)	To be noticed
✗	Cross	Incorrect element
✓	Tick	Correct element
[L Bracket	To identify and separate one of several attempts at an answer
]	R Bracket	
⏟	H wavy (error)	Error
⏟	V wavy (additional page)	Additional page (at bottom of page)

8. Bonus for Irish

Bonus marks at the rate of 10% of the marks obtained in S26T will be given to a candidate who answers S26T entirely through Irish and who obtains 75% or less of the total mark available in S26T (i.e. 270 marks or less). In calculating the bonus to be applied decimals are always rounded down, not up e.g., 4.5 becomes 4; 4.9 becomes 4, etc. No bonus applies to the Assessment Task. See below for when a candidate is awarded more than 270 marks in S26T.

Marcanna Breise as ucht freagairt trí Ghaeilge – JC Science 2019

Léiríonn an tábla thíos an méid marcanna breise ba chóir a bhronnadh ar iarrthóirí a ghnóthaíonn níos mó ná 75% d'iomlán na marcanna.

Ba chóir marcanna de réir an ghnáthráta a bhronnadh ar iarrthóirí nach ghnóthaíonn níos mó ná 75% d'iomlán na marcanna don scrúdú. Ba chóir freisin an marc bónais sin a **shlánú síos**.

Tábla 360 @ 10%

Bain úsáid as an tábla seo i gcás na n-ábhar a bhfuil 360 marc san iomlán ag gabháil leo agus inarb é 10% gnáthráta an bhónais.

Bain úsáid as an ngnáthráta i gcás 270 marc agus faoina bhun sin. Os cionn an mharc sin, féach an tábla thíos.

Bunmharc	Marc Bónais
271 - 273	26
274 - 276	25
277 - 280	24
281 - 283	23
284 - 286	22
287 - 290	21
291 - 293	20
294 - 296	19
297 - 300	18
301 - 303	17
304 - 306	16
307 - 310	15
311 - 313	14
314 - 316	13

Bunmharc	Marc Bónais
317 - 320	12
321 - 323	11
324 - 326	10
327 - 330	9
331 - 333	8
334 - 336	7
337 - 340	6
341 - 343	5
344 - 346	4
347 - 350	3
351 - 353	2
354 - 356	1
357 - 360	0

JC Science 2019 Draft Marking Scheme

S26 Section A

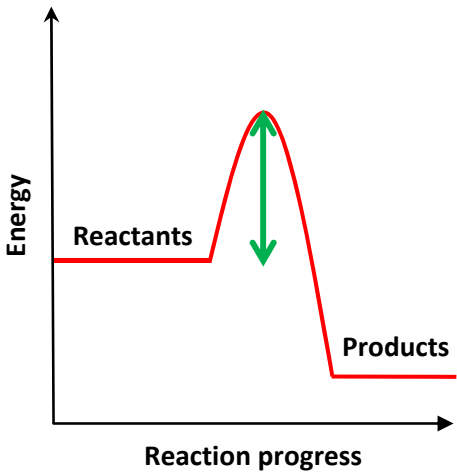
Q1		Marks
(a)	Nucleus	3
	Cytoplasm	3
	(Cell) membrane	3
(b)	Nucleus	3
(c)	Microscope	3

Q2		Marks
(a)	64	3
(b)	2 <u>Units:</u> g/cm ³	3
		3
(c)	C <u>Reason:</u> sinks most / lowest / bottom	3
		3

Q3		Marks
(a)	2	3
	3	3
	1	3
	4	3
(b)	Any valid answer, e.g. turning off taps, reduce flushing	3

Q4		Marks
(a)	1	1
	4	1
	4	1
(b)	Equal numbers of each type of atom on either side	6
(c)	Any valid answer, e.g. no new substance formed in a physical change	6

Q5		Marks
(a)	Three	3
(b)	Child (i.e. 10) is a sufferer	3
(c)	Characteristic	Genetically controlled
	Eye colour	✓
	How to cycle a bike	✓
(d)	Carry oxygen	3

Q6		Marks
(a)	Methyl orange / litmus / universal indicator etc.	3
(b)	Red / red / red, orange, yellow [correct colour – linked to (a)]	3
(c)	Seven	3
(d)	Exothermic	3
(e)	<p>Correct vertical distance shown between energy of reactants and max. energy</p> 	3

Q7		Marks
(a)	Stopwatch / timer	3
(b)	2.5	3
(c)	Stopped / speed of zero	3
(d)	From A to B: line is less steep (smaller slope) / smaller distance in greater time [accept converse from C to D]	3
(e)	Turned back / returned	3

Q8		Marks
(a)	Any valid activity e.g. burning fossil fuels (named fossil fuel) / deforestation	3
(b)	Any valid consequence e.g. flooding / erosion / loss of habitats	3
(c)	Any valid adaptation e.g. white / fat under skin / fur / wide paws / claws / teeth	3
(d)	Decrease	3
(e)	Freezing	3

Q9		Marks	
(a)	A Mouth	2	6
	B Trachea	2	
	C Lung	2	
(b)	<ul style="list-style-type: none"> • Diaphragm contracts / diaphragm lowers • Intercostal muscles contract / ribcage rises • Pressure decreases inside lungs • Lungs expand • Air taken in • Air travels through trachea • Oxygen leaves lungs / oxygen enters blood / gaseous exchange • Carbon dioxide leaves blood / carbon dioxide enters lungs / gaseous exchange <p style="text-align: right;">[any three]</p> <p style="text-align: right;">[accept gaseous exchange once only]</p>	3 + 3 + 3	9

Q10		Marks	
(a)	Solar system	3	
(b)	Galaxy	3	
(c)	A	3	9
	B	3	
	<u>Reason</u> : greater decrease in brightness / blocks more light	3	

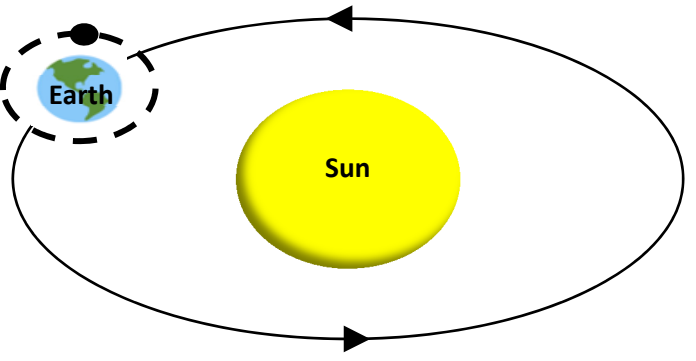

Q12			Marks
(a)	Points plotted Correct line drawn (for points plotted)	9×1 3	 12
(b)	Resistance increases with number of drops (or concentration)		3
(c)	Ohmmeter		3
(d)	Pipette / burette / graduated cylinder / syringe / volumetric flask		3
(e)	Any valid application described		3
(f)	Left ventricle	3	6
	----- Red: oxygen(ated) / blue: deoxygenated	3	

Q13		Marks	
(a)	Dishwasher	3	
(b)	Useful form of energy (for appliance named) [See table below]	3	12
	Unwanted form of energy (for appliance named) [See table below]	3	
	<u>Calculation:</u> 230	3	
	<u>Unit:</u> V	3	
(c)	Power is proportional to current	3	
(d)	The use of a resource so that it does not run out	6	
(e)	Any valid suggestion, e.g. turn off lights	2	
(f)	Solar	2	4
	Wind	2	

Appliance	Useful form of energy	Unwanted form of energy
Coffee maker	Heat	Sound
Television	Light / Sound	Heat
Kitchen blender	Kinetic	Heat / Sound
Dishwasher	Heat / Kinetic	Sound

Q14			Marks
(a)	Grains / vegetables / any high-fibre food		3
(b)	Mice not fed fatty acids and subjected to stress / Mice fed fatty acids and not subjected to stress		6
(c)	Decreased levels of depressive-like behaviour		3
(d)	Agree plus explanation / disagree plus explanation [agree or disagree may be inferred from explanation]		3
(e)	Any valid factor, e.g. pollution		3
(f)	Any valid example, e.g. cause disease		3
(g)	Sexual: involves sex cells (gametes) / two parents / genetic variation / fertilisation [accept converse for asexual]		3
(h)	<ul style="list-style-type: none"> • Genetic mutation • Variation between members of a species • Overproduction • Competition • Survival of the fittest • Beneficial genes passed on to offspring • New species formed / extinction <p style="text-align: right;">[any three]</p>	2 + 2 + 2	6

Q15		Marks	
(a)	Nitrogen / oxygen / argon / neon	3	
(b)	Availability is seriously threatened	3	
(c)	Recycle / upgrade less often / repair / sell old phones	3	
(d)	Particles (or atoms) are the same (colour)	3	
(e)	Aluminium Particles (or atoms) packed / particles (or atoms) close together	3 3	6
(f)	Aluminium in group 3 (or 13) Chlorine in group 7 (or 17) Al:Cl is 1:3 [award 9 marks for correct ratio without formula] AlCl ₃ [award 12 marks for correct formula]	3 3 3 3	12
(g)i	1 <u>Justify</u> : conductor of electricity	3 3	6
(g)ii	2 <u>Justify</u> : melting point below room temperature (20 °C) boiling point above room temperature (20 °C)	3 3 3	9

Q16			Marks	
(a)	Circular Moon Closer to Earth than Sun Orbit indicated around Earth		3 3 3	9
(b)	First image (image on the left) Right part of moon shaded		3 3	6
(c)	The Moon spins (on its axis) at same rate (in the same time) it takes to orbit the Earth	3 3	6	
(d)	Rock orbiting the Sun / rock in space		3	
(e)i	<u>Describe</u> : temperature increased and decreased <u>Explain</u> : increased in sunlight / decreased when not in sunlight		3 3	6
(e)ii	<u>Describe</u> : the greater depth, the smaller the change in temperature <u>Explain</u> : objects at depth not exposed to temperature extremes		3 3	6
(f)	C ----- Object (of the same mass) has less weight on Venus than on Earth		3 3	6
(g)	Gravitational force is greater on Earth than on Moon <div style="text-align: right;">[accept converse]</div>		3	

Assessment Task

AT Q1		Marks	
(a)	Statement of valid research question.	3	
(b)	Justification or reason given for choice.	3	
(c)	Any two valid books, websites, persons etc.	2+2	4

AT Q2		Marks	
(a)	Statement of relevant scientific knowledge.	5	
(b)	Statement with explanation. [award 2 marks for statement without explanation]	5	

AT Q3		Marks	
(a)	Name of resource.	2	5
	Explanation of reliability or lack of bias	3	
(b)	Name of resource.	2	5
	Explanation of unreliability or bias.	3	

AT Q4		Marks	
(a)	Statement with explanation. [award 2 marks for statement without explanation]	5	
(b)	Statement with explanation. [award 2 marks for statement without explanation]	5	

Notes on Marking Scheme for Assessment Task

1. Resources cited as part of an answer may have already been cited in previous answers.
2. An explanation may imply a statement.

