



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2015

Marking Scheme

Biology

Ordinary 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.

INTRODUCTION

1. The marking scheme is a guide to awarding marks to candidates' answers. It is a concise and summarised guide and is constructed so as to minimise its word content.
2. Examiners must conform to the scheme, as qualified by the following points, and may not award marks for answering outside this scheme.
3. The scheme contains key words or phrases for which candidates may be awarded marks. This does not usually preclude synonyms or phrases which convey the same meaning as the answer in the marking scheme.
4. Although synonyms are generally acceptable, there may be instances where the scheme demands an exact scientific term and equivalent non-scientific or colloquial terms are not acceptable.
5. In relation to particular answers, the scheme may include the words "any valid answer" and examiners will use their professional judgement to determine the validity of the answer. If in doubt, examiners should consult with their advising examiner before awarding marks.
6. A key word or phrase may be awarded marks only if it is presented in the correct context.
7. Where it comes to the attention of an examiner that a candidate has presented a valid answer and there is no provision in the scheme for accepting this answer, then the examiner must first consult with his/her advising examiner before awarding marks.

CANCELLED ANSWERS

The following is an extract from *S63 Instructions to Examiners 2015, 7.3, p.23*.

"Where a candidate answers a question or part of a question once only and then cancels the answer, you should ignore the cancelling and should treat the answer as if the candidate had not cancelled it"

e.g. *Question:* What is pollination?

Marking Scheme: transfer of pollen/ from anther/ to stigma **3(3) marks**

Sample Answer: ~~transfer of pollen/ by insect/ to stigma~~

The candidate has cancelled the answer and has not made another attempt to answer the question and may be awarded 2(3) marks.

SURPLUS ANSWERS

In Section A a surplus wrong answer cancels the marks awarded for a correct answer.

e.g. *Question:* The walls of xylem vessels are reinforced with

Marking Scheme: lignin **4 marks**

Sample answers:

(i) chitin, lignin – there is a surplus answer, which is incorrect, so the candidate scores 4–4 marks=0.

(ii) ~~lignin~~ – the answer, which is correct, has been cancelled, but there is no additional or surplus answer, therefore the candidate may be awarded 4 marks.

(iii) lignin, ~~chitin~~ - there is a surplus answer, which is incorrect, but it has been cancelled. The candidate has given more than one answer but the cancelling can be accepted and he/she may be awarded 4 marks.

(iv) ~~lignin~~, chitin – the correct answer has been cancelled and replaced with an incorrect one, so no marks are awarded.

In Sections B and C, where a specific number of points is asked for, and the candidate answers by providing a list of options, the examiner will only consider the first one, two or three items offered (as appropriate) even if a correct answer appears later in the list.

MARKING SCHEME CONVENTIONS

1. Words or phrases for which marks are to be awarded are separated by a solidus (/).
2. The mark allocated to an answer is indicated in bold next to the answer.
3. Where there are several parts in the answer to a question, the mark awarded for each part appears in brackets e.g. **5 (4)** means that there are five parts to the answer, each part allocated 4 marks.
4. The answers to subsections of a question may not necessarily be allocated a specific mark;
e.g. there may be six parts to a question – (a), (b), (c), (d), (e), (f) and a total of 20 marks allocated to the question. The marking scheme might be as follows: **2 (4) + 4 (3)**. This means that the first two correct answers are awarded 4 marks each and each subsequent correct answer is awarded 3 marks.
5. A word, term or phrase that appears in brackets is not a requirement of the answer and is given to contextualise the answer.
6. In Section C, do not read anything a candidate may have written on the question paper unless the candidate, in the answer book, makes specific reference to a particular part of a question having been answered where the question appears on the question paper.
7. Square brackets are used where the examiner's attention is being drawn to an instruction relating to the answer or to some qualification of the answer.

SECTION A
Answer any five questions

1			2(7)+3(2)
	(a)	Oxygen	
	(b)	Water	
	(c)	Fats are solid or oils are liquid	
	(d)	Reducing sugar (or named reducing sugar)	
	(e)	Magnesium or calcium or any other correct mineral	
2			2(5) + 5(2)
	(a)	FALSE	
	(b)	TRUE	
	(c)	FALSE	
	(d)	FALSE	
	(e)	TRUE	
	(f)	FALSE	
	(g)	TRUE	
3			2(5) + 5(2)
	(a)	A = Ovary B = Anther C = Petal	
	(b)	Sexual	
	(c)	Anther [<i>accept</i> stamen] or 'B' [<i>accept what candidate has called 'B' in part (a)</i>]	
	(d)	Attract insects or attract pollinators (or named pollinator)	
	(e)	A or ovary [<i>accept what candidate has called 'A' in part (a)</i>]	
4			2(7) + 3(2)
	(a)	Lizard	
	(b)	Homeostasis	
	(c)	Skin	
	(d)	Endotherm	
	(e)	Rabbit	
5			2(5) + 5(2)
	(a)	Food web	(1 pt)
	(b)	"Eaten by" or energy flow or food chains	(1 pt)
	(c)	Make their own food or carry out photosynthesis	(1 pt)
	(d)	Greenfly/ caterpillar/ snail/ mouse/ rabbit	(2 pts)
	(e)	Ladybird or blackbird or hedgehog or stoat or fox or sparrowhawk	(1 pt)
	(f)	3rd or secondary consumer	(1 pt)
6			2(5) + 5(2)
	(a)	Absorbed	(1 pt)
	(b)	Chlorophyll	(1 pt)
	(c)	Chloroplasts	(1 pt)
	(d)	Water/ carbon dioxide/ light/ enzymes/ suitable temperature (or warmth [<i>do not accept</i> heat])	(2 pts)
	(e)	Oxygen	(1 pt)
	(f)	Water	(1 pt)

SECTION B			
Answer any 2 questions ... 2(30)			
7			
	(a)		5 + 1
	(i)	Budding	
	(ii)	Free from micro-organisms	
	(b)		8(3)
	(i)	Any named tree or shrub	(1 pt)
	(ii)	Wear gloves or handled leaves with e.g. tweezers or put into plastic bag	(1 pt)
	(iii)	(Malt) agar	(1 pt)
	(iv)	One aseptic technique	(1 pt)
		attach leaves or leaf sections to (inside of) lid,	(1 pt)
		incubate	(1 pt)
	(v)	Pink colonies or pink with 'colonies' described	(1 pt)
	(vi)	e.g. Autoclave or incinerate or soak in disinfectant	(1 pt)
8			
	(a)		5 + 1
	(i)	Growth of seed (into new plant)	
	(ii)	Radicle	
	(b)		8(3)
	(i)	Water/ oxygen/ suitable temperature (or warmth [<i>do not accept</i> heat])	(1 pt)
	(ii)	To exclude oxygen [<i>accept</i> to exclude air]	(1 pt)
	(iii)	Some seeds may fail to germinate	(1 pt)
	(iv)	A	(1 pt)
	(v)	Tube A - germination	(1 pt)
		Tube B - no germination	(1 pt)
		Tube C - no germination	(1 pt)
		Tube D - no germination	(1 pt)
9			
	(a)		5 + 1
	(i)	A - T or G - C	
	(ii)	e.g. Radiation or chemicals or named chemicals e.g. cigarette smoke or viruses	
	(b)		8(3)
	(i)	e.g. Onion	(1 pt)
	(ii)	C or chop	(1 pt)
		B or add to blender	(1 pt)
		D or add protease	(1 pt)
		A or pour ethanol	(1 pt)
	(iii)	To breakdown protein (in the chromosomes)	(1 pt)
	(iv)	To breakdown (cell) membranes	(1 pt)
	(v)	To bring DNA out of solution (or allows DNA to be seen)	(1 pt)

SECTION C			
Answer any 4 questions.... 4(60)			
10			
	(a)		7 + 2(1)
	(i)	(Molecule) made of DNA and protein or chain of genes	(1 pt)
	(ii)	Both alleles the same	(1 pt)
	(iii)	Physical appearance (of organism) or expression of genotype	(1 pt)
	(b)		3(5)+4(3)
	(i)	1. Isolation; 2. Cutting; 3. Transformation; 4. Expression [Any three correctly placed]	3(5)
			4(3)
	(ii)	Enzymes	(1 pt)
	(iii)	Gene(s) or (piece of) plasmid or (piece of) DNA or (piece of) chromosome	(1 pt)
	(iv)	e.g. Bacteria (engineered to express genes to) produce human insulin/ sheep (engineered to express genes to) produce human growth factor in their milk/ rice (engineered to express genes to) produce Vitamin A	(2 pts)
	(c)		8(3)
	(i)	Genotype of pink parent : (RW)	(1 pt)
	(ii)	Gametes : (R) (W) x (W)	(3 pts)
		Offspring genotypes : (RW) (WW)	(2 pts)
	(iii)	Matching phenotypes : Pink White	(2 pts)
		[accept gametes and offspring genotypes if shown in Punnett square]	
11			
	(a)		7 + 2(1)
	(i)	Part of the earth (and atmosphere) that support life	(1 pt)
	(ii)	(An animal that) eats both plants and animals	(1 pt)
	(iii)	The role of the organism (in the ecosystem)	(1 pt)
	(b)		9(3)
	(i)	Named animal and suitable apparatus (or method) [No animal named - no marks for a collection method]	(2 pts)
	(ii)	e.g. paint or tag or snip hair or to avoid making animals conspicuous	(1 pt)
	(iii)	≥ 20	(1 pt)
	(iv)	A = number given in (iii) B = 20 Correct answer from candidate's figures	(1 pt) (1 pt) (1 pt)
	(v)	Conservation	(1 pt)
	(vi)	One suggestion	(1 pt)
	(c)		8(3)
	(i)	Honey (coloured)/ white	(2 pts)
	(ii)	Mice or rats	(1 pt)
	(iii)	Barns or old buildings	(1 pt)
	(iv)	Lack of nesting sites or poisoning from pesticides or a lack of food	(2 pts)
	(v)	Chemical (or substance) to kill insects (or to kill other plant pests)	(1 pt)
	(vi)	Eating poisoned prey	(1 pt)

12			
	(a)		7 + 2(1)
		(i) Breakdown of food	
		(ii) 1. Enzymes = chemical	
		2. Teeth = mechanical	
	(b)		9(3)
		(i) A = Duodenum (or small Intestine); B = Liver	
		C = Stomach; D = Pancreas; E = Colon (or large intestine)	(5 pts)
		(ii) Hydrochloric (acid) or HCl	(1 pt)
		(iii) Bile Emulsifies fat	(2 pts)
		(iv) Mouth or pancreas or salivary glands.	(1 pt)
	(c)		8(3)
		(i) Abdominal pain (or cramps)/ constipation/ diarrhoea	(2 pts)
		(ii) Water	(1 pt)
		(iii) Change diet (or example)/ medication (or example)	(2 pts)
		(iv) Muscular contraction/ to move food along	(2 pts)
		(v) e.g. Produce vitamins or out-compete pathogens	(1 pt)
13			
	(a)		7 + 2(1)
		(i) e.g. Exercise/ dietary (or example)/ specific medication or stop smoking	(2 pts)
		(ii) Left side pumps blood further	(1 pt)
	(b)		9(3)
		(i) A = Aorta B = Septum C = Right atrium	(3 pts)
		(ii) Lungs	(1 pt)
		(iii) Oxygenated	(1 pt)
		(iv) Coronary or cardiac	(1 pt)
		(v) C or Right atrium [accept what candidate has called 'C' in part (i)]	(1 pt)
		(vi) 72 (beats per minute) [accept 70 to 75]	(1 pt)
		(vii) Valves (closing)	(1 pt)
	(c)		8(3)
		(i) A = Larynx (or voice box) B = Trachea (or windpipe) C = Bronchus D = Alveolus (or air sac(s))	(4 pts)
		(ii) D or alveolus [accept what candidate has called 'D' in part (i)]	(1 pt)
		(iii) Make sound	(1 pt)
		(iv) Keep tube open	(1 pt)
		(v) (It can cause) e.g. cancer/ emphysema/ chronic cough/ COPD	(1 pt)

15			
	(a)		10(3)
	(i)	Blackberry = animal Sycamore = wind Peas = self or explosive	(3 pts)
	(ii)	Period of no germination (or no growth) despite usual conditions for germination being present	(1 pt)
	(iii)	Better chance of survival or gives time for seeds to be dispersed or allows time for seeds to mature	(1 pt)
	(iv)	Genetically or growth regulators or valid example	(1 pt)
	(v)	e.g. Cutting/ grafting/ layering/ micropropagation	(2 pts)
	(vi)	<i>Advantage</i> : Fast or all plants identical	(1 pt)
		<i>Disadvantage</i> : No variety or all susceptible to same diseases	(1 pt)
	(b)		10(3)
	(i)	A = Hair B = Blood vessel (or artery or vein or arteriole or venule) [<i>do not accept capillary</i>] C = Sweat gland D = (Erector) muscle	(4 pts)
	(ii)	C or sweat gland [<i>accept what candidate has called 'C' in part (i)</i>]	(1 pt)
	(iii)	Kidney or lung [<i>accept liver</i>]	(1 pt)
	(iv)	Protection against infection/ protection against dehydration/ sense organ/ temperature control	(2 pts)
	(v)	Stands up	(1 pt)
	(vi)	Sebum or oil	(1 pt)
	(c)		10(3)
	(i)	Diagram + 3 labels [<i>Diagram to include hypha(e) or stolon(s); minimum of 2 rhizoids; sporangium; sporangiophore</i>]	6,3,0 + 3(2) (non-sliding)
	(ii)	Saprophytic	(1 pt)
	(iii)	Breaks down dead matter or recycles nutrients	(1 pt)
	(iv)	Fungi	(1 pt)
	(v)	<i>Harmful</i> : e.g. rusts or mildews or ringworm (fungus) <i>Beneficial</i> : e.g. yeast or penicillium or blue mould in cheese	(2 pts)
	(vi)	Sexual	(1 pt)

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