Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2020

Marking Scheme

Biology

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

The marking scheme is a concise and summarised guide to awarding marks to candidates' answers. It is constructed to minimise its word content. Examiners must conform to the marking scheme, and may not award marks for answering outside this scheme. 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. 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.

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).
A key word or phrase may be awarded marks only if it is presented in the correct context.
(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).

How to use the marking scheme

- Where there is a range of possible parts in an answer, words, terms, or phrases for which marks are to be awarded are separated by a solidus (/).
- The mark allocated to an answer is indicated in bold next to the answer, or at the head of the question or section.
- 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.
- 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, with a total of 20 marks allocated to the question. In such a case the marking scheme might be as follows: **2 (4) + 4 (3).** This means that the first two correct answers encountered are awarded 4 marks each and each of the subsequent four other correctly answered parts are awarded 3 marks each.
- A word, term or phrase that appears in curved brackets is not a requirement of the answer and is given as a possible alternative phrasing, or to contextualise the answer. 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.
- In Section C, examiners are directed not to read anything a candidate may have written on the question paper.

Cancelled answers

The following is an extract from S.63 *Instructions to Examiners 2019, 5.3, p.14.*
"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."
Sample 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.
Sample Question: The walls of xylem vessels are reinforced with …….

- *Marking scheme:* lignin **4 marks**
    - (i) *Sample answer* - chitin, lignin
        - There is a surplus answer, which is incorrect, so the candidate scores 4 – 4 marks = 0.
    - (ii) *Sample answer* - lignin
        - This answer is correct. As there is no additional or surplus answer, the candidate may be awarded 4 marks.
    - (iii) *Sample answer* - 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) *Sample answer* - ~~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 are 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.

Section A — Answer any five questions – 100 marks

8+8+2+2(1)

1	(a)	Energy/materials for growth / repair
	(b)	Fish
	(c)	Potatoes
	(d)	C/ H/ O/ (all or nothing)
	(e)	Prevent constipation/stimulate peristalsis / helps bowels work /prevents bowel cancer

7+7+2+4(1)

2	(a)	True
	(b)	True
	(c)	True
	(d)	False
	(e)	True
	(f)	False
	(g)	True

7+7+2+4(1)

3	(a)	Arrow R humus/ animals/ plants to atmosphere
	(b)	Arrow P = atmosphere to plants
	(c)	Arrow B = fuel to atmosphere
	(d)	Starch /oil
	(e)	Decomposition
	(f)	Bacteria/ fungi/or named e.g. mushroom / moulds
	(g)	Plant more trees / stop burning fossil fuels / use electric cars / or other valid reason

8+8+2+2(1)

4 (a) Reusable

(b) Water bath

(c) Substrate

(d) Product

(e) Amylase

7+7+2+4(1)

5 (a) Cheek cell

(b) Amoeba

(c) Root hair

(d) Red blood cell

(e) Xylem

(f) Sperm

(g) Neuron

7+7+2+4(1)

6 (a) Plasma/ water

(b) Transport food/ maintaining temperature

(c) Platelets/ clotting protein

(d) A, B, O **any two**

(e) Red blood cells

(f) White blood cells

Section B **Answer any two questions – 60 marks**

(5 + 1)

7	(a)	(i)	Temperature regulation/ transport/ use in chemical reaction/ solvent / or other valid reason	
		(ii)	Allows passage of some molecules	

2(9)+6(1)

	(b)	(i)	Test tube (or valid named vessel)/ sugar solution	
		(ii)	Boiled potato/ or distilled water (in 'visking' tube)	
		(iii)	'Visking' tubing/ or potato tissue	
		(iv)	Mass/ turgid/ amount (volume) in tube	
		(v)	Increase in mass/ more liquid in the tube/ idea of fatter and more full	
		(vi)	From high water concentration to low water concentration	
		(vii)	Pickling/ high salt or sugar solution/ smoking/ or other valid method	

(5 + 1)

8	(a)	(i)	Whether an organism is present or not	
		(ii)	Fauna	

2(9)+6(1)

	(b)	(i)	Grassland/ or other valid named ecosystem	
		(ii)	Grass/ (or valid example linked to stated example in (i))	
		(iii)	Quadrat	
		(iv)	Throw behind back or randomly (over shoulder)	
		(v)	4	
		(vi)	16%	**(2 points)**
		(vii)	Repeat or calculate average	

(5 + 1)

9 (a) (i) Phototropism/ or geotropism/ or other valid named tropism

(ii) Must link with above answer (e.g. phototropism-stem growing upwards/ root growing downwards)

2(9)+6(1)

(b) (i) Dish B

(ii) Radish/ or other named valid seed type

(iii) Dropper/ to pour on/ bathe in

(iv) Ruler/ measuring tape

(v) Allow for failure or average/ to allow fair experiment

(vi) Stem was stimulated

(vii) Root was inhibited

(viii) Abscisic acid/ or other valid growth regulator

Section C **Answer any four questions – 240 marks**

10	(a)	(i)	Struggle for (limited) resources (food)/ organism struggling for resources	**3**
		(ii)	Makes own food	**3**
		(iii)	Role of organism	**3**
	(b)	(i)	Easy availability of food	**3**
		(ii)	Killed on road	**3**
		(iii)	Grass/ hedge or named hedgerow plant	**3**
		(iv)	Rabbit	**3**
		(v)	Grass>Rabbit>Fox>Eagle (-3 for one organism missing)	**3,3**
		(vi)	Sharp teeth/ colour/ low centre of gravity for speed/ or other valid adaptation	**3**
		(vii)	Reduce/ Reuse/ Recycle/ Repair (**any two**)	**3,3**
	(c)	(i)	Pooter diagram jar+two tubes/ Use by sucking up insects	**3+3**
			Pitfall Trap diagram + (cover)/ Use-dig hole/ leave	**3+3**
			Sweep net diagram net + handle/ Use drag over grass	**3+3**
		(ii)	(Biological) key/ book/ hand lens/ magnifying glass	**3**
		(iii)	Soil pH/ temperature/ or any other named abiotic factor	**3**

11	(a)	(i)	Haploid-Single set chromosomes	**3**
			Diploid-2 sets chromosomes	**3**
		(ii)	Meiosis	**3**
	(b)	(i)	Protein	**3**
		(ii)	Code for protein production	**3**
		(iii)	2 strands or helical or double helix	**3**
		(iv)	Thymine/ Capital "T"	**3**
		(v)	Cytosine/ Capital "C"	**3**
		(vi)	3 - 4 - 2 - 1 (all or nothing)	**3**
		(vii)	Nucleus	**3**
		(viii)	(Restriction)Enzymes	**3**
		(ix)	Paternity testing or forensics	**3**
	(c)	(i)	Dominant allele - B	**3**
		(ii)	Recessive Allele - b	**3**
		(iii)	1	**3**
		(iv)	Homozygous	**3**
		(v)	Bb	**3**
			Black	**3**
		(vi)	XY	**3**
			XX	**3**

12	(a)	(i)	Movement of molecules from a high concentration to low concentration	**3**
		(ii)	Pulmonary vein	**3**
		(iii)	Left atrium	**3**
	(b)	(i)	A = Larynx/ B = Trachea/ C = Bronchiole/ D = Bronchus	**4(3)**
		(ii)	Cartilage	**3**
		(iii)	Diaphragm or intercostal	**3**
		(iv)	Decreases	**3**
		(v)	Active requires energy/ passive (doesn't require energy)	**3,3**
	(c)	(i)	A = Villus/ B = Alveolus	**3,3**
		(ii)	A in small intestine/ B in lungs	**3,3**
		(iii)	Thin walls/ large capillary network/ numerous/ moist surface	**3,3**
		(iv)	Asthma inhaler/ avoid allergens	**3,3**

13	(a)	(i)	Traps sunlight energy/energised electrons/ take in or absorb light	**3**
		(ii)	Chloroplast	**3**
		(iii)	Glucose	**3**
	(b)	(i)	Sunlight	**3**
		(ii)	Oxygen	**3**
		(iii)	Stomata	**3**
		(iv)	Xylem/ tension/ osmosis/ root pressure (**any two**)	**2(3)**
		(v)	Electrons/ protons/ oxygen	**3(3)**
		(vi)	Increase carbon dioxide / fertilise plants/ or other valid method	**3**
	(c)	(i)	A is a monocot	**3**
		(ii)	Parallel veins/ scattered bundles/ floral parts in 3's (**any one**)	**3**
		(iii)	B is a dicot	**3**
		(iv)	Netted veins/ bundles in a ring/ floral parts in 5 (**any one**)	**3**
		(v)	Anchorage/ or other valid function	**3**
		(vi)	A=2/ B=3/ C=1	**3(3)**

14	(a)	(i)	Yeast	**3**
		(ii)	Carbon dioxide	**3**
		(iii)	Turns it a milky colour	**3**
		(iv)	Alcohol	**3**
		(v)	No more bubbles	**3**
		(vi)	Iodoform test	**3**
		(vii)	Yellow	**3**
		(viii)	Lactic acid	**3**
		(ix)	Cramps	**3**
		(x)	Yoghurt/ or other valid example of bioprocessing	**3**
	(b)	(i)	Stain/ (or a named stain)	**3**
		(ii)	A=Vacuole/ B=Cell Wall/ C=Cell membrane/ D=Mitochondria	**4(3)**
		(iii)	Strength or rigidity/ shape/ protection/ structure	**3**
		(iv)	Respiration/ release energy	**3**
		(v)	Similar cells working together /group of cells working together	**3**
		(vi)	Growing cells <u>outside</u> body or in laboratory	**3**
		(vii)	Micro-propagation or skin tissue for grafts/ or other valid application of tissue culture	**3**
	(c)	(i)	Bread/ or other valid answer	**3**
		(ii)	Not making its own food	**3**
		(iii)	Diagram	**(0,3)**
			Labels	**3(1)**
		(iv)	Label M - Sporangium on the diagram	**3**
		(v)	Sexual	**3**
		(vi)	Athletes foot/ or other valid example of a harmful fungus	**3**
		(vii)	Mushroom - food/ yeast – alcohol/ or other valid matching name and matching example	**3+3**
		(viii)	Antibiotics	**3**

15	(a)	(i)	1=B/ 2=A/ 3=C/ 4=D	**4(3)**
		(ii)	Allows light into eye	**3**
		(iii)	Rods/ cones	**3,3**
		(iv)	Disorder - short/ long sightedness or glue ear/ or other valid disorder	**3**
			Treatment - correct corrective lens or grommets/ or other valid treatment to named disorder	**3**
		(v)	Brain/ CNS/ Cerebrum	**3**
	(b)	(i)	1=D/ 2=B/ 3=A/ 4=C	**4(3)**
		(ii)	Transfer of pollen/ from anther to stigma	**2(3)**
		(iii)	Insect (animal)/ large petals / coloured petals/ or other valid answer	**2(3)**
		(iv)	Period of no growth/ allows winter to pass	**2(3)**
			Low seed activity/ seed is inactive/ will grow when conditions are better	
	(c)	(i)	A = Penis/ B = Urethra/ C = Sperm duct/ D = Testes	**4(3)**
		(ii)	D/ or testes	**3**
		(iii)	Carry sperm (to the penis)	**3**
		(iv)	Help sperm swim or nourish sperm	**3**
		(v)	Testosterone	**3**
		(vi)	Broad shoulders/ or other valid characteristic	**3**
		(vii)	Low sperm count/ example needs to be qualified e.g. as a result of cancer treatment	**3**