Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2013

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 S.63 *Instructions to Examiners 2013, 7.3, p.22.*

"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	
1.				**5(4)**
	(a)		Nitrogen	(1 pt)
	(b)		Carbohydrate/ monosaccharide/ sugar	(1 pt)
	(c)		A/ D/ E/ K	(1 pt)
	(d)		Benedict's (solution)/ Fehling's (solution)	(1 pt)
	(e)		Minerals / elements	(1 pt)
2.				**6(3) + 2**
	(a)		*A* = Stem or internode *B* = Leaf or midrib *C* = Root	(3 pts)
	(b)		*Function of A:* e.g. photosynthesis/support/ transport/ (food) storage *Function of B:* e.g. photosynthesis/ transpiration/ gaseous exchange/ (food) storage *Function of C:* e.g. anchorage/ absorption (of water or minerals)/ (food) storage	(3 pts)
	(c)		Sexual	(1 pt)
3.				**6(3) + 2**
	(a)		**T**	
	(b)		**F**	
	(c)		**F**	
	(d)		**F**	
	(e)		**T**	
	(f)		**T/F**	
	(g)		**F**	

4.				**6(3) + 2**
	(a)		*Cell division* = A/ *Interphase* = B	(2 pts)
	(b)		1. Mitosis 2. Meiosis (any order)	(2 pts)
	(c)		*Two causes:* e.g. viruses/ radiation/ (cigarette) smoking/ named pollutant	(2 pts)
	(d)		*A treatment:* e.g. chemotherapy/ radiotherapy/ surgery	(1 pt)
5.				**5(4)**
	(a)		Proteins	(1 pt)
	(b)		Temperature	(1 pt)
	(c)		Immobilised	(1 pt)
	(d)		Substrate	(1 pt)
	(e)		Reusable	(1 pt)
6.				**6(3) + 2**
	(a)		*A* = Cortex *B* = Medulla/ Pyramid *C* = Ureter	(3 pts)
	(b)		Bladder	(1 pt)
	(c)		Urine/ Urea/ Water/ Salt	(1 pt)
	(d)		Cortex/ Bowman's capsule/ glomerulus/ 'A' if correctly named in (a)	(1 pt)
	(e)		e.g. Dialysis/ transplant	(1 pt)

			SECTION B	
7.	(a)			**1 + 5**
		(i)	Chloroplast	**(**1 pt)
		(ii)	Oxygen	(1 pt)
	(b)		If parts (ii), (iii), (iv) and (vi) are not consistent from answer to answer then go with version that yields the greater marks.	**8(3)**
		(i)	Name of plant [must be aquatic]	(1 pt)
		(ii)	Increased or decreased lamp-beaker distance OR Different concs of $NaHCO_3$	(1 pt)
		(iii)	e.g. Temperature/ light intensity if CO_2 ticked/ CO_2 conc. if light intensity ticked	(1 pt)
		(iv)	Water bath if temperature/ (same) lamp at same distance if light intensity/ same conc $NaHCO_3$ if CO_2 conc.	(1 pt)
		(v)	(Count) bubbles/ per unit time	(2 pts)
		(vi)	Greater light intensity or higher CO_2 conc./ $\longrightarrow$ higher rate of photosynthesis OR Opposite statement	(2 pts)
8.	(a)			**1 + 5**
		(i)	Water	(1 pt)
		(ii)	Diffusion/ active transport	(1 pt)
	(b)	(i)	Diagram + 3 labels	**D. 6,3,0** **L.3(2)**
				4(3)
		(ii)	Same concentrations e.g. only water (in bag)	(1 pt)
		(iii)	e.g. increase (or decrease) in mass or volume of Visking tubing	(1 pt)
		(iv)	Water moved into (or out of) tubing	(1 pt)
		(v)	To compare (with the experiment)	(1 pt)

9.	(a)			**1 + 5**
		(i)	Wise management of natural resources	(1 pt)
		(ii)	To prevent extinction/ (to maintain) biodiversity/ (to maintain) the balance of nature	(1 pt)
	(b)			**8(3)**
		(i)	Apparatus 1name Named animal Diagram Apparatus 2 name Named animal Diagram	(6 pts)
		(ii)	Quadrat	(1 pt)
		(iii)	Quantitative surveys e.g. distribution, frequency, cover	(1 pt)

			SECTION C	
10.	(a)			**7 + 2(1)**
		(i)	Unit of heredity/ functional section of DNA	(1 pt)
		(ii)	Alternative form of a gene	(1 pt)
		(iii)	Genetic makeup (of organism)	(1 pt)
	(b)			**3(5) + 6(2)**
		(i)	*X* = Thymine or T *Y* = Cytosine or C	(2 pts)
		(ii)	Nucleus only – [accept chromosomes]	(1 pt)
		(iii)	mRNA	(1 pt)
		(iv)	Treating a DNA sample/ revealing a pattern/ unique to species or individual or compare with other pattern	(2 pts)
		(v)	Enzymes	(1 pt)
		(vi)	e.g. forensics/ paternity or maternity testing	(2 pts)
	(c)			**2(6) + 6(2)**
			Punnett square or other scheme shown	(1 pt)
			Cross completed correctly	(1 pt)
		(i)	XX = Female/ XY = Male	(2 pts)
		(ii)	*Female gametes* ⟶ (X) / *Male gametes* ⟶ (X) and (Y)	(3 pts)
		(iii)	XX and XY	(1 pt)

11.	(a)			**7 + 2(1)**
		(i)	Organism that makes its own food	(1 pt)
		(ii)	Role or 'occupation' of organism (in its habitat)	(1 pt)
		(iii)	Where an organism lives	(1 pt)
	(b)			**3(5) + 6(2)**
		(i)	Carbon dioxide/ methane/ water vapour	(1 pt)
		(ii)	They traps some of sun's heat (inside the atmosphere)	(1pt)
		(iii)	Any harmful addition to the environment	(1 pt)
		(iv)	e.g. More trees/ fewer cattle/ burn less fossil fuel	(1 pt)
		(v)	*A*= Decay; *B*= Photosynthesis; *C*= Combustion; *D*= Eaten by; *E*= Respiration [If no explicit matching is given then accept as fully correct either of the following sequences: (α) B; E; D; C; A. (β) Decay; Photosynthesis; Combustion; Eaten by; Respiration. Also accept parts of such sequences that place any of the above letters or terms in the correct position in their proper sequence e.g. "D" in third position or "Eaten by" in fourth position in their respective sequences.]	(5 pts)
	(c)			**2(6) + 6(2)**
		(i)	e.g. air pollution/ water pollution/ ground pollution	(2 pts)
		(ii)	1. Example of waste 2. How waste is managed	(2 pts)
		(iii)	e.g. Reduce/ Reuse / Recycle [Not multiple examples from same category]	(3 pts)
		(iv)	e.g. to consume waste e.g. sewage breakdown	(1 pt)

12.	(a)			**7 + 2(1)**
		(i)	Features that develop at or after puberty (but are not directly involved in reproduction)	(1 pt)
		(ii)	Facial hair/ broader shoulders/ larger larynx or deeper voice/ greater bone density/ greater bone strength/ pubic hair/ enlargement of genitals	(2 pts)
	(b)			**3(5) + 6(2)**
		(i)	Makes progesterone/ conducts food to embryo (foetus)/ conducts O_2 to embryo (foetus)/ conducts antibodies to embryo (foetus)/ removes CO_2 from embryo (foetus)/ removes urea from embryo (foetus)/ keeps the mother's and embryo's (foetus') blood apart.	(2 pts)
		(ii)	1. Contraction of uterus or waters break or dilation of cervix [accept labour] 2. Baby delivered 3. Afterbirth delivered	(3 pts)
		(iii)	*Benefit for baby:* mother-baby bonding/ antibodies in milk/ laxative in milk/ mother's milk encourages growth of mutualistic bacteria in large intestine/ milk sterile/ milk at body temperature *Benefit for mother:* bonding/ uterus recovers faster/ natural contraceptive/ reduces risk of breast cancer	(2 pts)
		(iv)	Inability to produce offspring	(1 pt)
		(v)	Fusion of gametes [accept fertilisation] outside the body (e.g. in a Petri dish)	(1 pt)
	(c)			**2(6) + 6(2)**
		(i)	Loss of blood/ loss of endometrium	(1 pt)
		(ii)	Release of egg (from ovary)	(1 pt)
		(iii)	(Time) when fertilisation is possible [accept "when you can get pregnant"] / when egg is in oviduct	(1 pt)
		(iv)	Oviducts	(1 pt)
		(v)	Embedding of embryo in endometrium	(1 pt)
		(vi)	Oestrogen/ progesterone/ FSH/ LH	(2 pts)
		(vii)	It stops	(1 pt)

13.	(a)			**3(3)**
		(i)	Diagram - three labels	**3,0 + 3(1)**
		(ii)	Electron microscope	(1 pt)
	(b)			**3(5) + 6(2)**
		(i)	Holds cell together/ selectively permeable/ displays antigens	2(pts)
		(ii)	~~*A* = Lipid / *B* = Protein~~ **7 marks to be allocated here as long as any part of 13 (b) attempted*	**7 marks** **[i.e. one 5+one 2]**
		(iii)	Mitochondrion	(1 pt)
		(iv)	To allow passage of materials – [accept (to make it) permeable]	(1 pt)
		(v)	Plant cells have a wall/ large vacuole/ chloroplast	(2 pts)
		(vi)	Sun/ light	(1 pt)
	(c)			**8(3)**
		(i)	Energy release (from food)/ without oxygen	(2 pts)
		(ii)	Cytoplasm	(1 pt)
		(iii)	Diagram and one label [only acceptable labels: oil; airlock; tube, where the tube is delivering gas into liquid]	**3,0 + 3**
		(iv)	Ethanol or alcohol/ carbon dioxide (CO_2)	(2 pts)
		(v)	Bubbling stopped	(1 pt)

14.	(a)			**10(3)**
		(i)	*A* = Ligament/ *B* = Cartilage/ *C* = Synovial fluid	(3 pts)
		(ii)	Strength/ support/ shape / mobility/ protection/ muscle attachment [accept blood cell production]	(2 pts)
		(iii)	Thoracic - back of chest/ Lumbar - small of back/ Sacral - back of pelvis/ Caudal or coccyx - tail end	(4 pts) Any two pairs
		(iv)	e.g. arthritis/ osteoporosis	(1 pt)
14.	(b)			**10(3)**
		(i)	Liquid (part of blood)	(1 pt**)**
		(ii)	Fight disease	(1 pt)
		(iii)	e.g. bone (marrow)	(1 pt)
		(iv)	Rhesus	(1 pt)
		(v)	1. Pacemaker/ 2. Right atrium	(2 pts)
		(vi)	Valves closing	(1 pt)
		(vii)	Coronary [accept cardiac] arteries	(1 pt)
		(viii)	e.g. eat less fat/ exercise regularly/ avoid excess stress/ eat less salt/ don't smoke	(2 pts)
14.	(c)			**10(3)**
		(i)	A =Semicircular canals/ B = Cochlea	(2 pts)
		(ii)	Balance	(1 pt)
		(iii)	Hearing	(1 pt)
		(iv)	Throat	(1 pt)
		(v)	Air	(1 pt)
		(vi)	Skin/ tongue/ nose	(2 pts)
		(vii)	*Disorder/ Corrective measure*	(2 pts)

15.	(a)			**10(3)**
		(i)	*A* = Stigma/ *B* = Anther/ *C* = Ovary/ *D*= Sepal	(4 pts)
		(ii)	Transfer of pollen/ (from anther) to stigma	(2 pts)
		(iii)	Wind/ insect/ other animal/ self	(2 pts)
		(iv)	Fertilisation	(1 pt)
		(v)	Pollen	(1 pt)
15.	(b)			**10(3)**
		(i)	Asexual / reproduction	(2 pts)
		(ii)	One example/ whether stem-root-leaf-bud	(2 pts)
		(iii)	Spread/ limited spread/ offspring all susceptible to same diseases	(2 pts)
		(iv)	e.g. Cuttings/ layering/ budding/ grafting	(2 pts)
		(v)	*Advantage:* e.g. can control production of desirable features *Disadvantage:* e.g. offspring all susceptilble to same diseases	(2 pts)
15.	(c)			**10(3)**
		(i)	*A* = Xylem *B* = Phloem	(2 pts)
		(ii)	A or Xylem	(1 pt)
		(iii)	B or Phloem	(1 pt))
		(iv)	Dead	(1 pt)
		(v)	Support	(1 pt)
		(vi)	e.g. root pressure/ cohesion/ adhesion/ transpiration stream	(1 pt)
		(vii)	Stomata	(1 pt)
		(viii)	Ground/ epidermal/ meristematic	(2 pts)

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