New Specification

Rewarding Learning

General Certificate of Secondary Education
2017–2018

Double Award Science
Biology

Unit B1

Higher Tier

[GDW12]

TUESDAY 15 MAY 2018, AFTERNOON

MARK SCHEME

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

					AVAILABLE MARKS
1	(a)	(i)	epidermis/epidermal layer	[1]	
		(ii)	guard cell	[1]	
	(b)	(i)	transparent	[1]	
		(ii)	waterproof/waxy/water resistant	[1]	
	(c)	• intercellular air space; • diffusion of gases		[2]	6

2 **(a)**

Results	
2	
2	= [1] mark
2	= [1] mark

[2]

(b) type 2 [1]

(c) reduce weight/eat less/exercise more [2]

(d) eye damage/kidney failure/heart disease/strokes [1] 6

				AVAILABLE MARKS
3	**(a)**	100 – 60 = 40%	[1]	
	(b)	higher temperature faster decomposition or how much has been decomposed • week **4 – 20**% left at **20** °C or 80% gone • week **4** – **40**% left at **10** °C or 60% gone • week **4** – **60**% left at **5** °C or 40% gone	[2]	
	(c) **(i)**	water/pH/O_2/amount of bacteria or fungi	[1]	
	(ii)	bacteria; fungi/mould	[2]	
	(iii)	• (produce) enzymes; • extracellular/saprophytic/secreted/produced at of cells; • digest/breakdown – large/to small molecules or – insoluble/to soluble molecules • microorganisms – absorb products	[3]	9

AVAILABLE MARKS

4 (a) Indicative Content

Any **six** from:
- (low temperature) – low collision rate
- (low temperature) – low reaction rate
- (optimum temperature) – max rate of reaction
- (optimum temperature) – more ES complexes formed quickly/more successful collisions
- (high temperature) – lower rate
- (high temperature) – enzymes denatured
- (high temperature) – causes changes in shape of active site
- (high temperature) – therefore enzymes and substrate cannot combine
- lock and key

Band	Response	Mark
A	Candidates use appropriate terms throughout to give **at least five** points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
B	Candidates use appropriate terms throughout to give **at least three or four** points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
C	Candidates use appropriate terms throughout to give **1 or 2** points from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

(b) inhibitors stop enzymes reacting with substrate/no or less product formed

any **one** from:
- inhibitors fit the active site of the enzyme/same shape as substrate
- stop substrate fitting into active site
- inhibitors not broken down [2]

8

				AVAILABLE MARKS
5	**(a)**	voluntary slower and reflex – faster; voluntary conscious and reflex – unconscious	[2]	
	(b) **(i)**	A – sensory B – association/relay/connector	[2]	
	(ii)	synapse	[1]	
	(iii)	muscles; glands	[2]	7
6	**(a)**	$6CO_2$; l.h.s. $C_6H_{12}O_6$; r.h.s $6O_2$; r.h.s	[3]	
	(b) **(i)**	carbon dioxide; because when **CO_2** increases rate of **PS** increases	[2]	
	(ii)	temperature	[1]	6
7	**(a)**	hormone	[1]	
	(b) **(i)**	X at tip	[1]	
	(ii)	more on l.h.s. than r.h.s.	[1]	
	(iii)	bent towards light	[1]	
	(iv)	(**more**) auxin on shaded side; auxin causes **cell** elongation	[2]	6

				AVAILABLE MARKS
8	(a)	describe – algae increases then decreases; [1] reason ↑ – increased due to increased nitrates/can make amino acids or proteins; reason ↓ – then (algae die/decrease) due to shading/lack of nitrates/nitrate/can't make amino acids or protein/depletion [2]	[3]	
	(b)	(i) due to photosynthesis/ **more** plants or algae	[1]	
		(ii) (decrease) due to plants/**algae dying**; fungi decomposers/bacteria; break down (dead) algae/decomposing the (dead) algae; bacterial respiration	[3]	7
9	(a)	carbon dioxide	[1]	
	(b)	B; the shortest time for hydrogencarbonate indicator to turn yellow	[2]	
	(c)	(i) Any **two** from: rate of photosynthesis and respiration equal; no change in CO_2; compensation point	[2]	
		(ii) photosynthesis greater than respiration; decrease in CO_2	[2]	
		(iii) (spinach) more photosynthesis (than cabbage)	[1]	8

				AVAILABLE MARKS
10	**(a)**	turn nitrogen gas into nitrates	[1]	
	(b)	C;	[1]	
		Any **two** from: • most denitrifying/denitrification • least nitrifying/nitrification • least nitrogen fixing/nitrogen fixing • ammonia to nitrate – if linked to nitrifying bacteria • nitrate to nitrogen – if linked to denitrifying bacteria	[2]	
	(c)	Any **three** from: • less energy; • less respiration; • less active uptake • against a concentration gradient • less protein/amino acids formed	[3]	7
			Total	**70**