Rewarding Learning

General Certificate of Secondary Education
2012–2013

Double Award Science: Biology

Unit B1

Higher Tier

[GSD12]

MONDAY 25 FEBRUARY 2013
9.30 am–10.30 am

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)** phototropism [1]	
	(b) auxin [1]	
	(c) **(i)** hormone/no auxin produced/no shoot tip; no growth/no cell elongation [2]	
	(ii) Any four from: shoot tip bends to light; hormone auxin moves to side away from light; shaded side; cell elongation on side away from light; more growth on side away from light/bends more on shaded side; shoot gets **more** light/can photosynthesise **more**; [4]	8
2	**(a)** **(i)** protein [1]	
	(ii) protease/pepsin [1]	
	(iii) Any **two** from: ● amount of enzyme/volume of enzyme solution; ● concentration of enzyme; ● pH of solution; ● same size/amount of gelatin cubes. [2]	
	(b) **Indicative content** ● no **breakdown** of gelatin/cube stays intact ● no amino acids produced ● amylase ***not*** specific for **protein/amylase** is specific for **starch** ● **protease** is only enzyme that breaks down gelatin ● **lock and key** model of enzyme activity ● **shape** of amylase does not fit with protein (gelatin) ● **temperature** is **not** the cause/35 °C is the optimum temperature for enzyme activity	

Response	Mark
Candidates use appropriate terms throughout to describe and explain in a logical manner what happens to the gelatin giving at least 5 points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
Candidates use some appropriate terms throughout to partially describe and explain what happens to the gelatin giving 3 or 4 points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
Candidates partially describe or explain what happens to the gelatin. They give 1 or 2 points from the indicative content. They use limited spelling, punctuation and grammar skills.	[1]–[2]
Response not worthy of credit.	[0]

[6]

(c) (i) Any three from:
- lining cells thin;
- short diffusion distance/close to blood/good blood supply
- presence of microvilli;
- increase surface area – must be linked to microvilli [3]

(ii) fatty acids; glycerol
either order [2]

(iii) more *digested* foods in B;
example glucose/sugar; amino acids; vitamins; minerals;
or two examples
less O_2/more CO_2 in B; [2]

AVAILABLE MARKS

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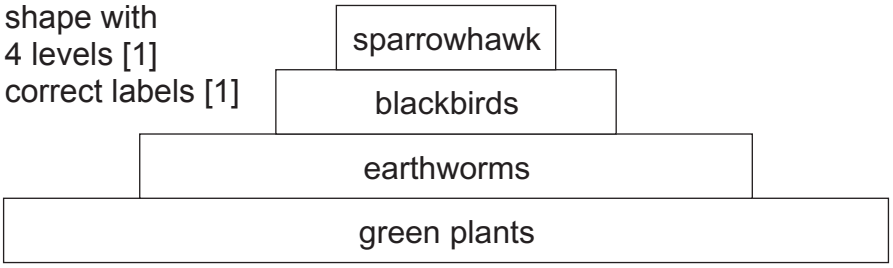
				AVAILABLE MARKS
3	**(a)**	**(i)**	invertebrates/insects/named examples [1]	
		(ii)	Any **three** from: ● dig hole; ● put in jar/container; ● put stones/cover on top/supported to allow invertebrate entry; ● return after certain time/leave overnight ● identify/count organisms. [3]	
	(b)	**(i)**	decomposition/decay [1]	
		(ii)	Any **two** from: ● segmented body; ● chaetae/s ● body temperature not constant [2]	
	(c)	**(i)**	quadrat [1]	
		(ii)	20 [1]	
		(iii)	more (in grassland)/fewer in quarry [1]	
		(iv)	not much soil in quarry/not much decaying matter/mostly rock/too dry **or** converse/damper near stream/in meadow [1]	
		(v)	repeat [1]	
		(vi)	not all worms come up to the surface/some remain underground [1]	13

AVAILABLE MARKS

4 **(a)** **(i)** blackbird/sparrowhawk [1]

(ii) less earthworms;
more eaten by blackbirds/because blackbirds have less/no beetles
or
less earthworms; because more aphids/less green plants [2]

(iii) shape with
4 levels [1]
correct labels [1]



[2]

(b) **(i)** Any **two** from:

- respiration/heat loss
- movement
- waste materials/excretion
- not all food digested
- reproduction. [2]

(ii) $\frac{420}{2105}$; $\times$ 100; 100 $-$ 19.95 $=$ 80.05

or 2105 $-$ 420 $=$ 1685;
1685/2105 $\times$ 100;
$=$ 80.05 [3]

(iii) less steps/trophic levels;
less energy loss; [2]

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				AVAILABLE MARKS
5	**(a)**	**(i)**	lowers it/reduces it [1]	
		(ii)	changes *glucose* to glycogen; increased respiration; *glucose* stored as fat; *more* uptake of glucose into cells; Any **two** [2]	
	(b)	**(i)**	type 1 do not produce insulin/type 2 do produce insulin/type 2 liver cells do not respond/type 2 caused by overweight/type 2 can be avoided/type 1 needs insulin injected type 2 linked to lack of exercise/sedentary lifestyle/type 2 controlled by diet [1]	
		(ii)	uses up sugar; less insulin produced/liver cells need to respond to less insulin; less chance of insulin injection being needed/less medication needed; lose weight; Any **two** [2]	6
6	**(a)**		A – yellow; C – purple [2]	
	(b)		no change in CO_2 levels/CO_2 produced is absorbed; because rates of photosynthesis and respiration are equal [2]	
	(c)		to show that pondweed is responsible for the changes/to show that changes only occur when pondweed present [1]	5

AVAILABLE MARKS

7 **(a)** **(i)** A – ammonia/ammonium compounds [1]

(ii) X – denitrifying [1]

(iii) active transport/active uptake [1]

(b) **Indicative content** – any **six** from:

- crops will grow without fertiliser;
- minerals/nitrates already in the soil;
- addition of fertiliser increases yield of potatoes; up to 40–150 kg/hectare
- farmer should use 40 kg/h for potato crop;
- for potato crop $>$ 40 kg/h is a waste/uneconomic;
- after 150 kg/h for potato there is a drop in yield
- barley crop – no increase in yield with the fertiliser
- farmer should use a different fertiliser for the barley;
- no point in adding fertiliser for barley
- fertiliser/nitrates lead to increased protein;
- fertiliser can be washed out/causes eutrophication

Response	Mark
Candidates use appropriate terms throughout to describe and explain in a logical manner what happens to crop yield when different fertiliser levels are added to soil with specific crops, i.e. potatoes and barley. They use at least 5 points from the indicative content. They demonstrate good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
Candidates use some appropriate terms throughout to partially describe and explain what happens to crop yields when different fertiliser levels are added to soil used for growth of potatoes and barley. They use 3 or 4 points from the indicative content. They demonstrate good spelling, punctuation and grammar skills. Form and style are of a high standard.	[3]–[4]
Candidates partially describe or explain what happens to crop yields when different fertiliser levels are added to soil for the growth of potatoes or barley. They use 1 or 2 points from the indicative content. They show limited spelling, punctuation or grammar skills.	[1]–[2]
Response not worthy of credit.	[0]

[6] 9

Total **70**