



Rewarding Learning

**General Certificate of Secondary Education
2014–2015**

**Double Award Science:
Biology**

Unit B1

Higher Tier

[GSD12]

TUESDAY 12 MAY 2015, 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)	the place where an organism lives	[1]	8
	(ii)	cliffs	[1]	
	(b) (i)	Shags eat surface swimming prey/fish/sand eels and herrings and cormorants eat bottom swimming prey/fish/flatfish and shrimps; They are not competing for the same food/prey/fish/different types of food eaten/don't eat each other's food	[2]	
	(ii)	decline in shag population; – due to lack of food; or shags relocate; to get food cormorants stay the same; cormorants still have food/don't eat surface dwelling species or cormorants increase; more space for nests	[4]	

- 2 (a) Any **two** from:
- (biological) catalysts
 - proteins
 - speed up reactions
- [2]
- (b) (i) amino acids [1]
- (ii) fat/lipid/oil/grease [1]
- (iii) use **too much** – is a waste/uneconomic/ends up in the waste water
don't use enough – stains not removed/substrate not fully digested [1]
- (iv) less energy is used/less electricity used/less fossil fuels burned/
less greenhouse gases/less CO₂ produced/less global warming [1]
- (v) there are no enzymes that would be broken down at higher
temperatures [1]
- (c) (i) glucose [1]
- (ii) more glucose/substrate in urine of person 1 or converse;
greater intensity of dye or greater degree of colour change in
person 1 or converse [2]
- (iii) enzyme is specific to glucose/shape of enzyme only fits with glucose/
it is specific/'lock and key' [1]
- (d) (i) insulin [1]
- (ii) pancreas [1]
- (iii) Any **three** from:
lowers blood glucose/sugar;
by converting glucose to glycogen;
increasing rate of respiration;
in the liver;
uptake of more glucose;
converting glucose to fat/stores it as fat [3]

16

3 (a) Indicative content

- 1. weigh cheese sample/using top pan balance/scales;
 - 2. put cheese sample onto mounted needle;
 - 3. (measure water) into measuring cylinder;
 - 4. add water to the test tube;
 - 5. record initial temperature of the water;
 - 6. set fire to cheese;
 - 7. place burning cheese under test tube;
 - 8. completely burn the cheese;
 - 9. stir the water before recording temperature;
 - 10. record final temperature of the water/measure (calculate) temperature change = 1 mark
- [6]

Response	Marks
Candidates use appropriate terms throughout to give at least five points about how to carry out the experiment. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
Candidates use appropriate terms throughout to give at least three or four points on how to carry out the experiment. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
Candidates use appropriate terms throughout to give one or two points about how to carry out the experiment. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

(b) Any three from:

- stirrer gives more even distribution of heat;
 - food more completely burned/more oxygen for burning of food;
 - energy not lost to surrounding air/more insulation/no heat can escape;
 - coiled glass tube means more heat transfer to water;
 - no cheese can fall off
- [3]

4 (a) allow time for reaction/allows time for the lactose to be broken down [1]

(b) (i) Lactose [1]

(ii) Glucose/galactose [1]

(c) The product is not contaminated with the enzyme/don't have to separate the enzyme from the product/enzymes won't be denatured/thermostable [1]

9

4

			AVAILABLE MARKS
5	(a) some light reflected from leaves/some light passes through leaves/ some light is the wrong wavelength/light hits bare ground	[1]	
	(b) Any two from: <ul style="list-style-type: none"> • active transport/active uptake • respiration/energy • proteins/amino acids • oils/lipids • starch • cellulose • reproduction/seeds/fruit/nectar 	[2]	
	(c) Trophic level 3	[1]	
	(d) (i) $120 + 80 = 200$; $300 - 200 = 100$ (100 = 2 marks)	[2]	
	(ii) not enough energy left for another level	[1]	7
6	(a) Nitrogen-fixing bacteria: turn nitrogen gas into ammonia/nitrates Nitrifying bacteria: turn ammonia/ammonium into nitrates (either order)	[4]	
	(b) (i) Extension/increased surface area	[1]	
	(ii) active uptake; requires energy; to move nitrate against a concentration gradient	[3]	
	(c) (i) Any four from: (nitrates cause) algal growth/bloom/plant growth; algae die/plants die; due to shading; bacteria decompose algae/plants; bacteria use up oxygen;	[4]	
	(ii) diluted	[1]	
	(iii) A has a low BOD and B has a high BOD	[1]	
	(iv) Between A and B mayfly larvae decrease (3 → 0) and bloodworms increase (1 → 5); mayfly larvae only survive in clean water/mayfly larvae cannot survive in polluted water/bloodworms will tolerate polluted water	[2]	16

			AVAILABLE MARKS	
7	(a)	(i) • 12 – 4am respiration only /respiration no photosynthesis • no light for photosynthesis;	[2]	
		(ii) • 6am – photosynthesis and respiration both occur/at the same rate; • CO ₂ in same as CO ₂ out/no net gas exchange/compensation point;	[2]	
		(iii) • 12 midday – 2pm maximum rate of photosynthesis ; • some other factor is limiting photosynthesis (other than light)/ named factor is limiting photosynthesis • more CO ₂ absorbed than produced	[2]	
	(b)	down to -2 between 8pm and 12 midnight	[2]	
	(c)	more photosynthesis/more glucose; photosynthesis at lower light levels/earlier in the day/ goes on longer in evening/ or can get enough light even when light blocked by other plants/ photosynthesise more in winter/ don't have to compete with other plants for light	[2]	10
			Total	70