Rewarding Learning

General Certificate of Secondary Education
2014–2015

Double Award Science: Biology

Unit B1

Higher Tier

[GSD12]

TUESDAY 24 FEBRUARY 2015, MORNING

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.

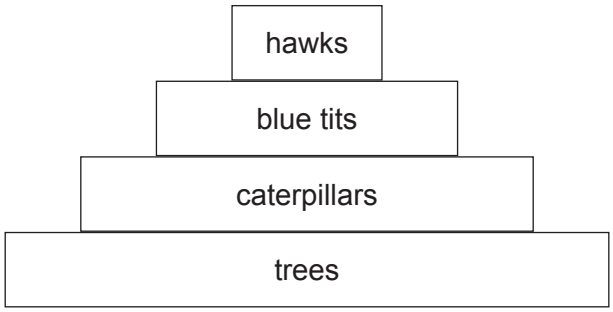
The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

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)** 6 (million) [1]	
	(b) They live/nest in long grass [1]	
	(c) Any **two** from: • nests/eggs are destroyed • chicks are killed • adults are killed • destroys food • will leave • nowhere to hide • ruining habitat • eaten by predators • nowhere to lay eggs [2]	
	(d) This allows the chicks/adults to escape (into other fields)/lays eggs at edges/ move habitat/birds not killed by machines [1]	
	(e) Have a backbone [1]	
2	**(a)** **(i)** Starch [1]	6
	(ii) Any **two** from: • large surface area • villi/microvilli • long/folds • good blood supply/diffusion gradient • lacteal • (villus) wall one cell thick/thin wall • permeable [2]	
	(b) **(i)** 3 or 4 points correctly plotted; Points joined by straight lines [2]	
	(ii) Any **two** from: • James up to 390, Richard 140 • James's level continues to rise for longer • James's blood glucose level is (always) higher • James's blood glucose takes longer to return to normal • James has a steeper increase • Times of peak (James 1.30, Richard 1) [2]	
	(iii) Any **three** from: • insulin is produced • in the pancreas • this hormone acts in the liver • and converts glucose into glycogen/stored as glycogen • and increases respiration of glucose [3]	
	(iv) Any **two** from: • eye damage/blindness • kidney failure/damage • heart disease/CHD/attack • stroke [2]	12

		AVAILABLE MARKS
3 **(a)**	From bottom up and clockwise Plants, rabbits, blue tits, thrushes 4 correct – 3 marks 2/3 correct – 2 marks 1 correct – 1 mark [3]	
(b) **(i)**	Plants [1]	
(ii)	Hawk [1]	
(c)	Heat (from respiration)/movement/excretion/egestion/uneaten materials, e.g. feathers and bones [1]	
(d)	 Symmetrical shape; Labels in correct order [2]	8

AVAILABLE MARKS

4 Indicative content

Method:

- Crush/crumble biscuit
- Add biscuit to test tube
- Heat in a **water bath** (or described)
- Add Benedict's (to biscuit)

Controlled variables:

- Equal masses of the two biscuits
- Biscuits crumbled to same extent
- Same volume of Benedict's
- Heated for same length of time

Conclusion:

- Brick red precipitate
- Biscuit sample that gives the **more** intense brick red colour contains more sugar

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout using at least five of the above points (must include one controlled variable and one conclusion) to describe how they would carry out this experiment and draw conclusions. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates must use some appropriate specialist terms throughout using three or four of the above points to describe how they would carry out this experiment and draw conclusions. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates describe how the experiment is carried out or draw conclusions using one or two of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 6

AVAILABLE MARKS

5 **(a)** 770 – 572 = 198;
198 ÷ 770 x 100;
= 25.71/25.7/26%
Accept: 26%/25.7%/25.71% [3]

(b) **Other countries** are producing more carbon dioxide/**other countries** burning a lot of fossil fuels/economic development in **other countries**/deforestation/air travel ↑/population increase/more cars etc in **other countries**/**other countries** are not ↓ emissions [1]

(c) Any **two** from:
- wind
- wave
- tidal
- geothermal
- solar/solar panels
- biomass
- hydroelectric power
- nuclear
- renewable energy [2]

(d) Any **two** from:
- global warming/temp ↑/higher temps
- climate change; drought; more rainfall; severe storms/unpredictable weather/severe weather
- melting (polar) ice
- sea levels rising
- increased flooding; mudslides
- loss of habitats/species extinction/plant death/trees die/↓ biodiversity
- increased desertification [2]

8

6 **(a)** To make amino acids/proteins [1]

(b) Cell has extension; increases surface area [2]

(c) **(i)** Any **two** from:
- (initial) concentration/volume (amount) of nitrate (in each test-tube)
- temperature
- pH
- time
- type/variety/size of barley seedlings/number of seedlings
- light intensity [2]

(ii) Any **four** from:
- data for description (5, 1) to (40, 10) ↑ by 9/(with more oxygen) more uptake up nitrate
- oxygen used in respiration/energy
- for active uptake/active transport
- from low concentration of nitrate to a high concentration/against the concentration gradient [4]

AVAILABLE MARKS
10

(iii) oxygen is no longer the limiting factor/seedlings taking up nitrate as fast as they can/some other factor limits nitrate uptake/no more nitrate left in test-tube to be taken up [1]

7 Indicative content

- air spaces provide oxygen or more O_2/soil aerobic
- decomposers need oxygen for respiration/release of energy
- aids active transport (or description of AT)

- convert ammonium into nitrate
- by nitrifying bacteria/nitrification

- also (oxygen) for converting nitrogen gas to nitrate
- by nitrogen-fixing bacteria/nitrogen fixation

- so less conversion of nitrate to nitrogen gas
- by denitrifying bacteria/denitrification

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout using at least five of the above points to describe how the actions of earthworms lead to an increase in soil fertility through the nitrogen cycle. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates must use some appropriate specialist terms throughout using three or four of the above points to describe how the actions of earthworms lead to an increase in soil fertility through the nitrogen cycle. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates describe how the actions of earthworms lead to an increase in soil fertility using one or two of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 6

	AVAILABLE MARKS

8 **(a)** the average mass of the carrots decreases [1]

(b) there is increased competition among plants

Any **two** from:
- for light/sunlight
- for minerals/named mineral/N/Ca etc.
- for space
- for water/moisture
- O_2
- CO_2
- each plant photosynthesises less [3] — 4

9 **(a)** Any **three** from:
- auxin (produced)
- in the shoot **tip**
- (light from one side causes) auxin (hormone) to accumulate on the **shaded side**/side away from light
- causes more **cell elongation** on the shaded side [3]

(b) Any **three** from:
- photosynthesis levels off after 20 °C
- respiration still increasing after 20 °C
- less difference between photosynthesis and respiration after 20 °C
- glucose used in respiration not available for plant growth
- glucose not available for plant growth [3]

(c)

Time	Colour of hydrogen carbonate indicator	Reason to explain colour of hydrogencarbonate indicator
2 am		Only respiration occurs Resp with no P/S or no light for P/S
12 noon	Purple	Photosynthesis is greater than respiration (both P/S + resp)
6 pm		Photosynthesis equals respiration/compensation point/rates same or CO_2 in = CO_2 out

[4] — 10

Total — **70**