Rewarding Learning

General Certificate of Secondary Education
2016

GCSE Biology

Unit 1

Higher Tier

[GBY12]

FRIDAY 10 JUNE, 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)** Quadrat; [1]

(b) Ensure sample unbiased/make it a fair test/representative; [1]

(c) Count/average the number of daisies **per** quadrat/apparatus X/0.25 m^2; [1]
Multiply the number per quadrat by 4/sum or add 4 quadrats; [1] [2] — 4

2 **(a)** Dissolves in/combines/reacts; with water (in clouds)/water vapour; [2]

(b) Defoliates trees (which then die)/(acidifies lakes so) animals die; [1]

(c) Sulfur dioxide emissions decrease;
Burning less coal/smokeless zones/laws inforced to reduce emissions/ catalytic converters in cars/low sulfur fuels/burn less fossil fuels/increased use of renewable energy; [2] — 5

3 **(a)** **A** – retina; [1]
Contains light sensitive cells/rods/cones; [1]
B – vitreous humour; [1]
Maintains shape of eye; [1] [4]

(b) Focus/bend/refract light on to retina; [1] — 5

4 **Indicative Content**

1 (Less trees/less plants so) less photosynthesis;
2 Less CO_2 used by plants/less CO_2 absorbed from atmosphere;
3 Combustion/burning produces/releases CO_2 into atmosphere;
4 Overall CO_2 in atmosphere increases;
5 (Increased atmospheric CO_2 linked to) global warming/increased temperature;
6 Irregular weather pattern;
7 Ice caps melt/flooding/sea levels rise;
8 loss of habitat/species

Accept: bullet points which start with capital letter, contain a verb and end in full stop as sentences.

Band	Response	Mark
A	Candidates **must use appropriate, specialist terms** throughout **using <u>at least 5</u> of the points**. They use **good** spelling, punctuation and grammar and the form and style are of a **high standard**.	[5]–[6]
B	Candidates use **some appropriate, specialist terms** throughout **using <u>at least 3</u> of the points**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory standard**.	[3]–[4]
C	Candidates make **little use of specialist terms** throughout **using <u>at least 1</u> of the points**. The spelling, punctuation and grammar, form and style are of a **limited** standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] — 6

				AVAILABLE MARKS
5	(a)	A – Trachea; [1] B – Bronchiole; [1] C – Alveolus/alveoli; [1] D – Intercostal muscle; [1]	[4]	
	(b)	Any **four** from: Intercostal muscles contract; Ribs move up and out; Diaphragm contracts/flattens; Increased volume; Decreased pressure/pressure becomes lower than atmospheric;	[4]	8
6	(a)	Yellow/brown; [1] to blue/black; [1]	[2]	
		Iodine diffuses/moves/spreads out; [1] Through starch agar; [1] From a high [iodine] concentration to a low [iodine] concentration/down concentration gradient; [1]	[3]	
	(b)	**Conclusion** – Increasing temperature increases diffusion [rate]; [1] **Petri dish 3** – Larger/largest dark area, when temperature is highest/ 20 °C; [1] Iodine molecules move further/faster/have more [kinetic] energy; [1]	[3]	
	(c)	Dark area drawn greater than in Petri dish at 15 °C;	[1]	9
7	(a)	**(i)** Males have higher energy requirement than females; [1] Males have greater proportion of/more muscle; [1] accept converse	[2]	
		(ii) 9350 – 8500/850; ÷ 8500; 10%;	[3]	
		(iii) Energy needed for growth of baby;	[1]	
		(iv) Activity/manual (physical) work vs desk work;	[1]	
	(b)	**(i)** Obesity increases then decreases; [1] up to/from 55–64 years; [1]	[2]	
		(ii) (30 – 20)/10;	[1]	
		(iii) From 2004 to 2015: 30 + 10 = 40;	[1]	
		(iv) % obese men aged 45–54 decreased/didn't follow trend;	[1]	
	(c)	Sick days/loss of work force/sick pay/sick benefits [1] Cost of medical treatment/to NHS; [1]	[2]	14

				AVAILABLE MARKS
8	(a)	$C_6H_{12}O_6$; [1] $6H_2O$; [1] $6CO_2$; [1]	[3]	
	(b)	Alcohol/ethanol: produced by anaerobic/not by aerobic; [1] Water: produced by aerobic/not by anaerobic; [1] Energy: aerobic produces more than anaerobic; [1]	[3]	
	(c)	**(i)** Glucose; [1] → lactic acid + energy; [1]	[2]	
		(ii) CO_2 (produced in yeast)/yeast produces alcohol, **not** lactate	[1]	9
9	(a)	Fertiliser/slurry/urine/faeces/sewage;	[1]	
	(b)	Eutrophication; [1] Plant growth/algal bloom; [1] Plant death; [1] Increased bacterial respiration/decomposition; [1] (any **three**)	[3]	
	(c)	C; [1] 2.7<2.8 mg l^{-1} of oxygen dissolved in the water; [1] Bloodworms are able to survive/tolerate low oxygen concentration; [1]	[3]	7
10	(a)	Any **one** from: Reflected off the sea/water; Misses the unicellular algae/absorbed [used] by other plants Some changed into heat/absorbed by water;	[1]	
	(b)	200 000 – (17 000 + 1600); [1] 181 400; [1] kJ [1]	[3]	
	(c)	(200 ÷ 200 000) × 100; [1] 0.1%; [1]	[2]	
	(d)	Shorter food chain/human acting as primary rather than secondary consumer; [1] Less energy lost; [1] Humans would receive 1600 kJ rather than 200 kJ/8 times more energy; **or** have access to 200,000 kJ rather than 1600 kJ/198,400 kJ more/ 125 times more [1]	[3]	9

					AVAILABLE MARKS
11	(a)	(i)	**C**;	[1]	
		(ii)	Shape complementary with/fits enzyme's active site; [1] Enzymes are specific; [1] Lock and key [1]	[3]	
	(b)	(i)	Correct shape and correct optimum temperature	[1]	
		(ii)	10 °C – slow reaction; [1] enzyme molecules have little (kinetic) energy/reduced number/few collisions; [1] 70 °C – **no** reaction; [1] enzyme denatured; [1]	[4]	9
12	(a)	(i)	Root hair cell;	[1]	
		(ii)	Large surface area;	[1]	
		(iii)	Replace/provide (nitrates/proteins); [1] Removed/harvested; [1]	[2]	
	(b)	(i)	y-axis scale; [1] Plots [× 2]; [2] Lines; [1] Key/lines labelled [5 °C, 25 °C]; [1]	[5]	

(ii) **Indicative Content:**

1 More nitrates absorbed at higher temperature/25 °C;
2 Same [rate] over first 10 min;
3 5 °C – **stops** after 20 min/stays at 0.09 mg; **or** 25 °C – Slows down/continues at slower rate after 10 min/slows down;
4 25 °C/higher temperature gives higher [enzyme] activity;
5 More respiration/energy released;
6 For active transport of nitrates/against diffusion gradient;

Accept: bullet points which start with capital letter, contain a verb and end in full stop as sentences.

Band	Response	Mark
A	Candidates **must use appropriate, specialist terms** throughout **using five of the above points**. They use **good** spelling, punctuation and grammar and the form and style are of a **high standard**.	[5]–[6]
B	Candidates **use some appropriate, specialist terms** throughout **using three of the above points**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory standard**.	[3]–[4]
C	Candidates make **little use of specialist terms** throughout **using some or all of the above points**. The spelling, punctuation and grammar, form and style are of a **limited standard**.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 15

Total **100**