Rewarding Learning

General Certificate of Secondary Education
2017–2018

Double Award Science: Biology

Unit B1

Higher Tier

[GSD12]

WEDNESDAY 21 FEBRUARY 2018, 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)** **(i)** hormone [1]

(ii) blood (stream) [1]

(b) A;
D and E; (in this order)
B; [3]

(c) diabetes [1]

(d) **(i)** brain and spinal cord (either order) [2]

(ii) receptors [1]

(iii) muscles/named muscle/gland/named gland [1] 10

2 **(a)** phototropism/tropism [1]

(b) bends/grows towards the light;
hormone (made/produced/released);
in tip;
(hormone is) auxin;
hormone moves/more accumulates to shaded side/more on shaded side;
hormone causes **cell** elongation (on shaded side)/cells lengthen

Response	Marks
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]
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]
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]
Response not worthy of credit.	[0]

[6] 7

				AVAILABLE MARKS
3	(a)	(i)	abiotic [1]	
		(ii)	decreased/became acidic/less alkaline/pH went down/closer to sea, pH is higher/goes from 7.9 to 6.5 [1]	
		(iii)	pH paper/pH meter/universal indicator/pH probes [1]	
	(b)		grazing/disease/competition/trampling/not enough space/cows/rabbits/horses/insects/goats/bacteria/fungi/human activity or described/manure/herbivores [1]	
	(c)		• highest soil moisture content at sand dune 5; water needed for photosynthesis; • highest mineral content at sand dune 5; more active uptake/protein; (accept converse for sand dune 1) • pH closer to neutral [2]	6
4	(a)	(i)	more enzymes/more pectinase/higher conc. enzymes; more collisions with pectinase/more reactions (with substrate)/enzymes work faster/more breakdown/more ES complexes [2]	
		(ii)	24 and 6 read from graph; 24 – 6 = 18; 18 ÷ 6 × 100 = 300 correct answer = [3] marks [3]	
	(b)		There is only a certain amount of apple juice in the pulp/no more juice left in the pulp/no pectin left/all pectin broken down/no substrate left [1]	
	(c)	(i)	6; [1]	
		(ii)	Any **three** from: • enzyme not specific/enzymes specific only pectinase can break down pectin • shape of enzyme/active site does not fit with substrate(pectin)/enzyme not complementary/doesn't match substrate • lock and key • therefore pectin not broken down [3]	10

				AVAILABLE MARKS
5	(a)	(i)	• takes away the oxygen quickly/more blood for O_2 to diffuse into/quicker diffusion/speeds up diffusion/more diffusion • (maintains the) concentration gradient/O_2 moves from high to low concentration [2]	
		(ii)	Any **two** from: • thin/one cell thick/short diffusion distance/one layer thick/no gap between air sac and capillary • moist (walls) • large surface area • permeable [2]	
	(b)	(i)	remains clear/colourless/no change; (all) CO_2 has been absorbed/no CO_2 present [2]	
		(ii)	cloudy; CO_2 produced; by **respiration** (in the mouse) [3]	
	(c)	(i)	more energy in aerobic (accept converse) [1]	
		(ii)	lactic acid/lactate [1]	11
6	(a)		Improve reliability of results/identify anomalies [1]	
	(b)	(i)	Between sites C and D [1]	
		(ii)	Decreased by 12/from 13 to 1 species/only 1 species at D drops from 13 at/drops to 1 at D must have 1 number at least [1]	
	(c)		Shading/nitrate depletion; algae/aquatic plants die; (box 2 and 3 either order) if phrased correctly (bacteria) use up the oxygen – bacteria implied/decomposers; animals die (box 5 and 6 either order) [4]	7

					AVAILABLE MARKS
7	(a)	(i)	A – Nitrogen gas/nitrogen (in the air)/atmospheric nitrogen; B – ammonia (in the soil)/NH_3/NH_4/NH_4^+	[2]	
		(ii)	C – denitrification; D – nitrogen fixation	[2]	
		(iii)	root hair cells	[1]	
		(iv)	protein/amino acids	[1]	
	(b)	(i)	A had uptake of **1.2** – B had uptake of 6.6 (6.6 – 1.2); 5.4 arbitrary units	[2]	
		(ii)	less oxygen present in A/more oxygen present in the solution of B; less respiration in root of A/more respiration in roots of B; less **active uptake** in roots of A/more active uptake can take place in roots of B or active transport	[3]	
	(c)		respiration/active uptake at its max./other factor is limiting/oxygen is no longer limiting/no nitrate left (in the solution)/nitrate is limiting/pH limiting/temp limiting/can't take up any more nitrate/nitrate uptake at its max	[1]	12
8	(a)		volume/concentration of hydrogencarbonate indicator/brightness of bulb/temperature/same bulb/(amount of) pondweed	[1]	
	(b)		**At 10 cm:** • Photosynthesis faster than respiration/more photosynthesis than respiration (both processes needed); • More carbon dioxide used up (than produced)/low CO_2/CO_2 levels fall/less CO_2 made	[2]	
			At 20 cm: Any **two** from: • Photosynthesis equal to respiration/compensation point • Carbon dioxide used up at same rate as produced No change in carbon dioxide level/normal CO_2 level/atmospheric CO_2 level/no net gas exchange	[2]	
			At 40 cm: Any **two** from: • Photosynthesis slower than respiration/more respiration than photosynthesis • Less carbon dioxide used (than produced) Carbon dioxide levels increase/more CO_2 made/high CO_2	[2]	7
				Total	**70**