Rewarding Learning

General Certificate of Secondary Education
2014

GCSE Biology

Unit 1

Higher Tier

[GBY12]

FRIDAY 6 JUNE, 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)**	A – Trachea;		[1]	
		B – Rib;		[1]	
	(b)	Breathe in – diaphragm contracts/flattens	[1]		
		Breathe out – diaphragm relaxes/moves up/dome shaped;	[1]	[2]	4
2	**(a)**	A – Iris;		[1]	
		B – Pupil;		[1]	
	(b)	**(i)** B/pupil larger/increased diameter;		[1]	
		(ii) More light enters eye;	[1]		
		So image can be formed/seen (on retina);	[1]	[2]	5
3	**(a)**	As the distance (from the centre) increases, the concentration of SO_2 decreases;		[1]	
	(b)	At between 0 < 2 km/SO_2 equal to 68 < 73 au; Credit: correct distance/ SO_2 conc			
		Average number of lichen species 0.3 (± 0.1); Reject: 2/3 (must have decimal place)			
		Between 0 and 2 km;		[2]	
	(c)	Burning fossil fuels/petrol/diesel (in vehicles);		[1]	
	(d)	Indicator (species);		[1]	5
4	**(a)**	0.10 – 0.09 = 0.01	[1]		
		(0.01 × 100) ÷ 0.10 = 10%;	[1]	[2]	
	(b)	Red/Lamb's lettuce;	[1]		
		(Red) Loses no vitamin C/(Lamb's) has largest amount of vitamin C left;	[1]	[2]	
	(c)	**(i)** (20 ÷ 100) × 60 = 12;		[1]	
		(ii) 12/50 **or** 24%; ECF		[1]	6

			AVAILABLE MARKS
5	**(a)**	Any **two** from: Description: A activity decreases while B increases **and** decreases; Activity: B **maximum** activity lower than A; Rate: B faster decrease than A; Range: B has narrower range of activity/B **fully** denatured; Optimum temperature: B higher optimum temperature; [2]	
	(b)	20 °C; (Less cost) for electricity/less energy needed heating water when using a biological washing powder; [2]	
	(c)	Breakdown of large/complex/insoluble molecules **or** makes small/simple/soluble molecules; so they can pass through the wall of the intestine (capillary)/into the blood; [2]	
	(d)	Speed up reactions (without being changed themselves); [1]	7
6	**(a)**	**(i)** A – Nucleus; [1] B – Cytoplasm; [1] [2]	
		(ii) Protoctista; [1]	
	(b)	Any **three** from: Amoeba changes shape/moves towards food; Surrounds/engulfs food; Food inside food vacuole; Food digested/broken down in (vacuole); Phagocytosis; [3]	
	(c)	Plant – Chloroplasts; Animal – Cell wall absent/flagellum for movement; [2]	8

				AVAILABLE MARKS
7	(a)	Any **three** from: Absorbs more glucose from blood/lowers blood glucose concentration; Converts glucose to glycogen/fat; Storage; Glucose respired;	[3]	
	(b) (i)	5.5 mmol per litre;	[1]	
	(ii)	Increases;	[1]	
	(iii)	(Nicholas) Blood glucose concentration above normal/too high; [1] (Nicholas) **greater** variation of concentration; [1]	[2]	
	(iv)	Any **two** from: Thirst; Lethargy; Urinating frequently; Glucose in urine; Other appropriate response (only once);	[2]	
	(v)	Any **two** from: Eye damage; Kidney failure; Heart disease/high blood pressure Stroke; Other appropriate response (only once);	[2]	
	(c)	Any **three** from: Diabetes increases with age; 16–34 number of cases the same; More male cases (in all other age groups); Beyond 65 – number of cases in both genders levels off/increases slower; Biggest difference in cases between 16–34 and 35–54;	[3]	14
8	(a)	Rory; [1] Rory BMI = 31/32; [1]	[2]	
	(b) (i)	32 700 ÷ 1090; [1] = 705 (J per day) = 30 days; [1] 93 – 30 = 63 days; [1]	[3]	
	(ii)	Balance energy use and energy intake/Reduce/control food intake; [1] Continue exercising; [1]	[2]	
	(c)	Any **two** from: Age; Gender; Pregnancy;	[2]	9

				AVAILABLE MARKS
9	**(a)**	A – Sensory (neurone); B – Muscle/effector;	[1] [1]	
	(b)	X↑;	[1]	
	(c)	Any **two** from: Short distance; Small number of neurones/some long neurones; Small number of synapses;	[2]	
	(d)	Any **four** from: Electrical impulse (arrives at synapse); (Neurotransmitter) **chemical** produced/released (by neurone); **Diffusion** (to chemical (/neurotransmitter)); **Across** gap/space/between neurones; High enough concentration of chemical; Causes/triggers impulse **in next neurone**;	[4]	
	(e)	Slower/no impulses pass along neurone;	[1]	10

10 **Indicative content:**

1. Phototropism;
2. Auxin;
3. (Auxin/hormone) produced (by cells) at tip of shoot/stem;
4. (Auxin/hormone) moves/diffuses down shoot/stem;
5. One-sided light causes uneven distribution/higher auxin/hormone concentration in shaded side;
6. (Auxin/hormone) causes (individual) cells to lengthen;
7. More cells lengthen in shaded side/shaded side grows faster than light side;
8. Shoot/stem **bends**/**grows** towards light;

Response	**Marks**
Candidates **must use appropriate, specialist terms** throughout **using at least FIVE of the above points**. They use **good** spelling, punctuation and grammar and the form and style are of a **high standard**.	[5]–[6]
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]
Candidates make **little use of specialist terms** throughout **using ONE of the above points**. The spelling, punctuation and grammar, form and style are of a **limited** standard.	[1]–[2]
Response not worthy of credit.	[0]

[6] 6

				AVAILABLE MARKS
11	**(a)**	Tube containing indicator (but no pond weed);	[1]	
	(b)	Different mass/size/number of leaves;	[1]	
	(c)	Any **two** from: Temperature; **Concentration** of indicator; Mass of plant (if not given in **(b)**); pH; Species of pondweed;	[2]	
	(d)	Hydrogencarbonate (indicator) Accept: bicarbonate indicator	[1]	
	(e)	Photosynthesis **greater than**; [1] Respiration; [1] Carbon dioxide low/decreases/used up; [1]	[3]	
	(f) **(i)**	Red;	[1]	
	(ii)	Any **two** from: Light intensity; At which photosynthesis equals respiration; O_2 production equals consumption/CO_2 produced equals CO_2 used;	[2]	11

		AVAILABLE MARKS
12 **(a)** To produce amino acids/proteins; [1] for growth; [1] [2]		
(b) **Active** uptake/absorption/transport; [1]		
(c) **(i)** Any **four** from: Waterlogged soil; Little or no oxygen/anaerobic; Denitrifying bacteria **active**; Change nitrates; Into **nitrogen gas**; [4]		
(ii) Nitrogen compounds **dissolve**/soluble in water; Percolate/move through soil; [2]		
(d) **Indicative content:** 1. Total of nitrogen compounds produced equals the amount absorbed by plants; 2. Higher temperatures make bacteria more active; 3. **Aerobic** conditions/bacteria; 4. Saprophytic/decomposing bacteria/decomposition; 5. Produce ammonium compounds; 6. Nitrifying bacteria/nitrification; 7. (Ammonia compounds) → nitrates; 8. Nitrogen-fixing bacteria (in soil active/root nodules); 9. Producing nitrate/ammonium compounds from nitrogen (gas); 10. **Reduced** denitrification/**less** nitrates → nitrogen gas;		

Response	Mark
Candidates **must use appropriate, specialist terms throughout** to explain how nitrogen cycle bacteria maintain a constant amount of nitrogen compounds in the soil while the amount in the wheat increases **using at least FIVE of the above points**. They use **good** spelling, punctuation and grammar and the form and style are of a **high standard**.	[5]–[6]
Candidates **use some appropriate, specialist terms throughout** to explain how nitrogen cycle bacteria maintain a constant amount of nitrogen compounds in the soil while the amount in the wheat increases **using at least THREE of the above points**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory standard**.	[3]–[4]
Candidates make **little use of specialist terms throughout** to explain how nitrogen cycle bacteria maintain a constant amount of nitrogen compounds in the soil while the amount in the wheat increases **using at least ONE of the above points**. The spelling, punctuation and grammar, form and style are of a **limited standard**.	[1]–[2]
Response not worthy of credit.	[0]

[6] 15

Total **100**