Rewarding Learning

General Certificate of Secondary Education
2016–2017

Science: Single Award

Unit 1 (Biology)

Higher Tier

[GSS12]

WEDNESDAY 22 FEBRUARY 2017, 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)	Pancreas	[1]	
		(ii)	Reduces blood glucose levels [1] by converting it to glycogen [1]	[2]	
	(b)	(i)	More exercise than normal/more carbohydrate than normal used/missed breakfast/didn't eat enough [1] resulted in low blood sugar levels [1]	[1] [2]	
		(ii)	Take glucose/or by example	[1]	
	(c)		Any **two** from: • Type 2 affects mainly older people (or converse) • Type 2 patients produce (some) insulin but doesn't work properly/ Type 1 patients do not produce insulin • Type 2 linked to lifestyle (or converse) • Type 2 treated by diet/tablets/exercise/seldom by insulin (or converse)	[2]	
	(d)		Any **two** from: • hormones a chemical signal/nervous system electrical • hormones travel in the blood/nervous coordination along neurones/ nerve cells • hormones usually act slower than nervous action	[2]	10
2	(a)	(i)	A condition passed on genetically	[1]	
		(ii)	Gametes correct [1] offspring correct [1]	[2]	
		(iii)	Genotypes with DD and Dd circled	[1]	
		(iv)	75%/3 in 4 (or equiv) (use ECF from (iii)) (must match diagram)	[1]	
	(b)		Individuals can be easily grouped/discrete categories	[1]	6
3	(a)	(i)	42/30 [1] 1.4 [1]	[2]	
		(ii)	Enough room for them all to grow (to their maximum)/no competition	[1]	
	(b)		As number of seedlings in pot increases total mass increases up to 45g/ when 25 seedlings in the pot more seedlings contributing to overall mass (decrease) due to competition at higher densities	[3]	6

AVAILABLE MARKS

4 Indicative content

- microorganisms contain antigens/antigens stimulate the body
- white blood cells/lymphocytes produce antibodies
- antibodies and antigens are a complementary shape
- antibodies latch on to antigens/microorganisms
- causing immobilisation of microorganisms
- phagocytes engulf microorganisms
- and digest them/break them down

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe how the body can combat harmful microorganisms using **six or seven** of the points above, in a logical sequence. 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 to describe how the body can combat harmful microorganisms using **three, four or five** of the points above, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates describe how the body can combat harmful microorganisms 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 have made limited use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 6

5 (a) (i) Number of extinctions remains low/unchanged from 1880 to 1920 [1]
after 1920 number of extinctions increases dramatically [1] [2]

(ii) Any **two** from:
- hunting
- loss of habitat/introduce competitive invasive species
- humans introducing predators/animals/plants that spread disease [2]

(b) (i) Better adapted survive/less well adapted die out
increase in number of better adapted organisms over time [2]

(ii) Darwin [1]

7

				AVAILABLE MARKS
6	(a)	(i)	Arrow(s) added as appropriate to show that all the heat energy doesn't reflect back through greenhouse layer [1]	
		(ii)	Global warming leads to melting of polar ice caps [1] water from melted ice caps cause sea levels to rise [1] [2]	
		(iii)	Non-living factor [1]	
	(b)	(i)	Any **two** from: • burning fossil fuels [1] • sulfur dioxide + water vapour (in clouds) [1] • forms sulfuric acid [1] [2]	
		(ii)	Graph for pH and number of species same shape/peaks and/or troughs at same time in both graphs [1]	
		(iii)	1990 [1]	
	(c)		Filters/reduce fossil fuel use/alternative fuels [1]	9
7	(a)	(i)	Prostate gland [1]	
		(ii)	Any **three** from: • sperm made in the testes • travel in the sperm tubes • close to/beside/through the prostate gland • and leave body via the urethra [3]	
	(b)	(i)	Both involve hormone action [1] both prevent ovulation/eggs being released [1] [2]	
		(ii)	Less likely to forget to take pill at right time/day/don't have to remember to take pill each day/complexity of some days when don't take pill [1]	7
8	(a)	(i)	Bases on one strand of DNA join with bases of second strand [1] in particular combinations such as A with T/C with G [1] [2]	
		(ii)	Everyone has different DNA [1] difference is due to order of bases (along coding strand) [1] [2]	
	(b)	(i)	Possibility of having/passing on an inherited/genetic condition [1]	
		(ii)	Benefit – possibility of planning treatment earlier/can decide not to have children/screen before having children [1] Disadvantage – insurance more expensive/may not get insurance [1] [2]	
	(c)		Work checked by other scientists [1] to confirm that it is correct/can lead to improvements [1] [2]	9

	AVAILABLE MARKS

9 **(a)** Change (to number/structure) [1]
of chromosome/gene/DNA [1] [2]

(b) **(i)** Smaller/larger nucleus [1]

(ii) (Tumour grows) and breaks edge of blood vessel/cancer cells enter blood at damaged part [1]
spreads in blood (to other parts of body) [1] [2]

(c) **(i)** Percentage of population with skin cancer increasing over time [1]

(ii) More use of tanning studios [1]
and more continental sunny holidays [1]
more UV light [1] [3] 9

10 **Indicative content**

- amount of carbon dioxide produced = amount used/carbon dioxide stays the same
- the snail produces carbon dioxide
- carbon dioxide produced by respiration
- the plant uses carbon dioxide
- carbon dioxide used in photosynthesis
- in tube A the amount of carbon dioxide is increasing because only a snail respiring
- in tube B the amount of carbon dioxide is decreasing because more photosynthesis than respiration

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe gas exchange in Tube C using **five, six or seven** of the points above, in a logical sequence. 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 to describe gas exchange in Tube C using **three or four** of the points above, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates describe gas exchange in Tube C 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 have made limited use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 6

Total **75**