Rewarding Learning

General Certificate of Secondary Education
2014–2015

Science: Single Award

Unit 1 (Biology)

Higher Tier

[GSS12]

WEDNESDAY 12 NOVEMBER 2014, 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)**	Faster/protective/does not involve thinking time [1]		
		(ii)	Spinal cord [1] pulling his hand away [1] [2]		
	(b)	Any **two** from: • hormones are produced by glands • travel in the blood • only affect certain organs called target organs • act more slowly • act over a longer period of time • hormones are chemicals/nervous system is electrical [2]			
	(c)	**(i)**	Any **two** from: • blood glucose level is higher at start for a person with diabetes • blood glucose levels rise more steeply/quickly for a person with diabetes • blood glucose levels fall more slowly for a person with diabetes • blood glucose levels do not level off for a person with diabetes • blood glucose levels are higher for a person with diabetes [2]		
		(ii)	Pancreas [1]		8
2	**(a)**	**(i)**	Time for antibodies to be made [1]		
		(ii)	Takes time for immunity level to be achieved [1] antibody level remains high/immunity level maintained [1] [2]		
	(b)	**(i)**	So they do not give the person the disease [1]		
		(ii)	Antigens [1]		
		(iii)	Any **three** from: • antibodies latch on to microorganisms • microbes clumped together/immobilised • phagocyte surrounds/engulfs microorganisms • break down/digest microorganisms [3]		8
3	**(a)**	**(i)**	All points plotted correctly [2] 5 points correct [1] correct line joining points [1] [3]		
		(ii)	Number of deaths increased from 2005 to 2008/to 31 over time [1] peaked at 2008/31 then decreased [1] [2]		
	(b)	Cold or flu caused by a virus/don't work on viruses [1] antibiotics only work on bacteria [1] [2]			
	(c)	After antibiotic only resistant bacteria remain after reproduction only resistant bacteria but more of them [1]			8

4 Indicative content

- extinction increasing from 1920
- species are extinct when there are no living examples left/have died out
- climate change or natural disasters/meteor hit the Earth/flooding/global warming
- loss of habitat/deforestation/pollution/invasive species
- hunting (by humans)/overfishing
- disease
- legislation (preventing the hunting of endangered species)/laws
- special programmes such as creating nature reserves/education/ breeding programmes/increased mesh sizes/reforestation [6]

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe extinction, the reasons why it is happening and what is being done to prevent it, using **six to eight** 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 must use appropriate specialist terms throughout to describe extinction, the reasons why it is happening and what is being done to prevent it, using **three to 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 extinction, the reasons why it is happening and what is being done to prevent it, using **one or two** of the points above. However these are not presented in a logical sequence. They use limited spelling, punctuation and grammar. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

AVAILABLE MARKS

6

AVAILABLE MARKS

5 **(a)** **(i)** Her pulse does not go as high during exercise [1]
her pulse rate returns to normal quicker/her pulse rate after 5 minutes/ exercise is lower than others [1] [2]

(ii) Any **three** from:
- strengthens heart (muscle)
- increases output (when not exercising)
- therefore needs to beat less often/lower heart rate
- (high respiration rate) stops cholesterol/fat accumulating
- reduces obesity putting less strain on heart [3]

(b) **(i)** There is a greater percentage of obese adults in 2010 than 2009 **or** obesity increases with age up to 55/64 (and decreases in older age groups) [1]
Eating more junk food/less exercise or appropriate alternative [1] [2]

(ii) Large numbers of people/UK wide surveyed [1]

(c) Not insure/higher premiums/insured for lower amount [1]
Need more medical care/link to shorter life span/more likely to make claim [1] [2] 10

6 **(a)** **(i)** T and C (both for 1 mark) [1]

(ii) Nucleus [1]

(b) **(i)** Base triplet is a series of three bases [1]
each sequence of three bases/base triplet codes for one amino acid [1]
(sequence of) amino acids is built up into a protein [1] [3]

(ii) 270 [1]

(c)

Scientist(s)	**Discovery**
Chargaff	Quantitative analysis of bases.
Franklin and Wilkins (both needed for one mark) [1]	Used X-ray diffraction to show overall shape of DNA.
Watson and Crick	Used modelling to show double helix shape of DNA/A–T or C–G linked [1]

[2] 8

				AVAILABLE MARKS
7	**(a)**	**(i)**	Genes (DNA) have been transferred [1] from one type of organism (species) to another [1] [2]	
		(ii)	Any **two** from: • could escape and produce superweeds • cause allergies • GM crops could be more expensive [2]	
	(b)		Any **two** from: • if excess not used by plants • builds up to toxic levels in the soil • (if on sloping land) can run off into waterways • increase in algal growth • correct consequence of algal growth (e.g. fish die due to shortage of oxygen) [2]	6
8	**(a)**	**(i)**	Number/range of species [1] that occur in a particular area [1] [2]	
		(ii)	Any **two** from: • public access is restricted (to certain areas to avoid trampling of fragile habitats) • habitat is managed by removing invasive shrubs or trees (to allow light to get to other plant species)/habitat protected from pollution/ building • many nature reserves have education centres that educate the public about habitats and species that are being protected [2]	
	(b)		Produce oxygen for (animal) respiration [1] are producers/provide food/provide shelter for animals [1] [2]	6
9	**(a)**	**(i)**	Less risk of a miscarriage or damage to the foetus [1]	
		(ii)	Three chromosomes drawn [1]	
		(iii)	Whether to have a termination or not/parents may find it difficult to cope [1]	
	(b)	**(i)**	Grandfather [1]	
		(ii)	Christine = Aa [1] Sophia = aa [1] [2]	
	(c)		Addition of normal gene into individual with defective gene [1] normal gene provides normal functioning in individual [1] effect limited as difficult to target all areas of body/can cause allergies/ donor genes not replaced by body/next generation will still have condition [1] [3]	9

10 Indicative content

- decomposition/decay happens when the animal or plant dies/excretion (by animals)/animal waste
- (micro-organisms such as) bacteria/fungi
- break (their protein) down to ammonia
- (to be of use to plants) ammonia (needs to be) converted to nitrates
- by nitrifying bacteria
- in a process called nitrification
- plants use the nitrates to make proteins/plants absorb nitrates from the soil
- nitrates/proteins are needed for growth [6]

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe the nitrogen cycle, using **six to eight** 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 must use appropriate specialist terms throughout to describe the nitrogen cycle, using **three to 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 the nitrogen cycle, using **one or two** of the points above. However these are not presented in a logical sequence. They use limited spelling, punctuation and grammar. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

AVAILABLE MARKS

6

Total **75**