Rewarding Learning

General Certificate of Secondary Education
2013–2014

Science: Single Award

Unit 1 (Biology)

Higher Tier

[GSS12]

MONDAY 24 FEBRUARY 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)** **Any one** ● leaves greenfly blue tit owl ● leaves moth larva blue tit owl ● bark moth larva blue tit owl (correct animals) [1] Starts with producer [1] [2]	
	(ii) Squirrel/mouse/greenfly/moth larva/blue tit [1]	
	(b) The number of squirrels would increase [1] as there are less foxes to eat them/more squirrels survive to breed or they survive longer to breed [1] [2]	5
2	**(a)** **Any three from** ● Vaccines cause antibodies (to be produced) (by white blood cells) ● called lymphocytes ● these antibodies lock on to antigens on pathogen ● due to complementary shape ● clumping/immobilisation ● destroyed by phagocytes/phagocytosis/(other) white blood cells ● memory cells [3]	
	(b) **(i)** **Any two from** ● to see how effective the drug is on humans ● to find out what the required dose is ● to see if there are any harmful side effects/to check if safe ● animals are a different species/react differently [2]	
	(ii) People think it is cruel/harms the animals/any ethical issue [1]	
	(c) Cheaper to produce (than antibiotics and painkillers) [1] average profit per drug is greater (than antibiotics and painkillers) [1] [2]	
	(d) Antibiotic resistance/bacteria have mutated [1] due to overuse/not taking the full course [1] [2]	10
3	**(a)** Both bars completed correctly and shading [1]	
	(b) 200 [1] 40 [1] [2]	
	(c) With increased cannabis use, increased number of users have depression [1]	
	(d) User – Impaired judgement qualified/lack of inhibition qualified/liver or brain damage [1] Society – Family breakdown/absenteeism at work/antisocial behaviour/violence/cost of treating alcohol linked diseases/ crime [1] [2]	6

AVAILABLE MARKS

4 (a) (i) Non-living factors [1]

(ii) Climate change/size of polar ice caps/sea levels [1]

(b) Indicative content

- Plants take in/use carbon dioxide
- Process A is photosynthesis/by photosynthesis
- Plants and animals produce carbon dioxide
- Process B is respiration/by respiration
- Burning/use of fossil fuels produces carbon dioxide
- Process C is combustion/by combustion
- Deforestation
- Increased combustion/increased use of fossil fuels

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe the carbon cycle and why it has become unbalanced using **six to eight** of the points above, and which must include the names of at least two of the processes (A, B and C), 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 the carbon cycle and why it has become unbalanced 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 carbon cycle and/or why it has become unbalanced 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	Not worthy of credit.	[0]

[6] 8

AVAILABLE MARKS

5 **(a)**

Food group	Function in the body
protein	growth and repair
carbohydrate	**to give us energy**
fat	to give us energy and for warmth

[3]

(b) **(i)** Add Benedict's solution [1]
heat [1] [2]

(ii) Blue to orange/red [1] 6

6 **(a)** Brightly coloured flowers/scented/grows quickly/any appropriate characteristic [1]

(b) **(i)** Only one parent/offspring similar [1]

(ii) **Any two from**
- many offspring can be produced
- no variation explained (all will have desirable property)
- can be done indoors
- plants will grow quickly (seed stage avoided) [2]

(c) **(i)** **Any two from**
- chemicals
- that travel in blood
- to a target organ [2]

(ii) **Any two from**
- repairs the uterine lining (following menstruation)
- causes ovulation/release of eggs
- stimulates the production of progesterone
- explanation of any above point [2] 8

		AVAILABLE MARKS
7 (a) (i)	**Any three from** ● nitrate in sewage ● sewage (rich in nitrogen-containing compounds) decomposes into ammonia ● by microorganisms/fungi/bacteria ● ammonia converted to nitrate/nitrification ● by nitrifying bacteria [3]	
(ii)	**Any two from** ● dilution in water ● used by plants ● sticking to river bank [2]	
(b) (i)	(From 1960) rises to a peak of 30%/in 1980 then falls [1] levels off after year 2000/falls over the entire time [1] [2]	
(ii)	Less acid rain [1] due to chimney filters/alternative fuels [1] [2]	
(iii)	In 2010 trees still (15% of forest) damaged [1]	
(c)	Part that receives most rain/most delicate part [1]	11

AVAILABLE MARKS

8 (a) (i) Photosynthesis [1]

(ii) (Significant) increase in atmospheric oxygen [1]
oxygen needed for respiration/active animals required a lot of oxygen/more plants for food [1] [2]

(b) Indicative content

- variation in bacteria (some with mutation/some not)
- mutated bacteria resistant to antibiotic (methicillin)
- they survive as others killed by antibiotic
- this is natural selection (must be linked to bullet point above)
- genes passed on to offspring/MRSA proportion increases over time
- MRSA is a new type of bacteria that demonstrates evolution/ increase in resistance over time demonstrates evolution

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe how the development of MRSA demonstrates both natural selection and evolution using **five or six** 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 development of MRSA demonstrates both natural selection and evolution 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 how the development of MRSA demonstrates natural selection and/or evolution 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	Not worthy of credit.	[0]

[6]

9

AVAILABLE MARKS

9 **(a)**

	H	h
h	Hh	hh
h	Hh	hh

gametes [1]

offspring based on gametes [1]

Offspring genotypes: Hh Hh hh hh [1]

Offspring phenotypes: Huntington's disease normal [1] [4]

(b) **(i)** Grandson [1]

(ii) hh [1]
must be hh as if any H alleles present would show condition/cannot be carriers [1] [2]

(c) **(i)** Genetic screening [1]

(ii) No cure possible/prefers positive outlook/hopes he does not have the condition/many years until condition will have an effect/impact on insurance [1]

(d) Addition of normal gene/allele into individual with defective gene/allele(s) [1]
normal allele provides normal functioning in individual [1]
effect limited as difficult to target all areas of body/can cause allergies/other harm described/donor genes not replaced by body/next generation will still have condition [1] [3] 12

Total **75**