Rewarding Learning

General Certificate of Secondary Education
2016–2017

# Science: Single Award

## Unit 1 (Biology)

## Higher Tier

**[GSS12]**

**TUESDAY 16 MAY 2017, 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) | ff | [1] | |
| | (b) | Gametes correct [1]<br>offspring correct [1] | [2] | |
| | (c) | Based on viable Punnett square | [2] | 5 |
| 2 | (a) | (i) Coronary arteries are very narrow [1]<br>less cholesterol needed to cause a blockage [1] | [2] | |
| | | (ii) glucose + oxygen [1] → carbon dioxide + water [1] | [2] | |
| | | (iii) Provide energy | [1] | |
| | (b) | (i) £12 000 less income | [1] | |
| | | (ii) Ill parent unable to work/other parent needs time off work to care for patient | [1] | |
| | | (iii) Many people affected/long time needed in hospital (care)/specialist equipment or drugs needed | [1] | 8 |
| 3 | (a) | (i) Brain | [1] | |
| | | (ii) Muscle | [1] | |
| | | (iii) Less [1] faster [1] | [2] | |
| | (b) | (More) hormones/auxin on shaded side of plant/shoot/stem [1]<br>(more) growth on that side [1]<br>plant bends towards light [1] | [3] | 7 |

AVAILABLE MARKS

**4 Indicative content**

- peer pressure/experimentation/addicted/enjoy the experience/being sociable
- tar
- causes cancer/bronchitis/emphysema
- carbon monoxide
- causes blood to carry less oxygen
- nicotine
- is addictive/affects heart rate

| Band | Response | Mark |
|---|---|---|
| A | Candidates must use appropriate specialist terms throughout to describe a reason why people smoke and the harm it can cause 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 a reason why people smoke and the harm it can cause using **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 a reason why people smoke and/or the harm it can cause using **one to three** 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)** Any **two** from:

- not native/introduced by man
- spread rapidly
- outcompete/cause harm to native species [2]

**(b) (i)** Primary consumer [1]

**(ii)** Reduce numbers/eliminate giant hogweed [1]
as cutting/using chemical sprays has no effect [1]
and causes harm to humans [1] [3] 6

| | | | | | AVAILABLE MARKS |
|---|---|---|---|---|---|
| 6 | (a) | (i) | Antibodies have complementary shape to the microorganism's antigens [1]<br>antibodies join with antigens/microorganism [1]<br>immobilise/stop the microorganisms from spreading [1] | [3] | |
| | | (ii) | Body will produce a different type of antibody/antibody with a shape that matches the (new) microorganism | [1] | |
| | (b) | | In active immunity antibodies are produced by the body [1]<br>in passive immunity antibodies are produced by another source and injected [1] | [2] | 6 |
| 7 | (a) | (i) | Oestrogen level peaks just before ovulation | [1] | |
| | | (ii) | Repairs/builds-up the uterus lining | [1] | |
| | (b) | (i) | (Progesterone levels) peak/are at highest between days 16 – 24 **and** remain steady | [1] | |
| | | (ii) | Maintain the uterus wall in preparation for pregnancy | [1] | |
| | (c) | | At this time both oestrogen and progesterone levels [1]<br>are low [1] | [2] | 6 |
| 8 | (a) | (i) | One extra chromosome/to give 47 [1]<br>in every cell [1] | [2] | |
| | | (ii) | Skin cancer | [1] | |
| | (b) | (i) | 52% and 96% surviving [1]<br>44% [1] | [2] | |
| | | (ii) | Those with the mutation are not eaten by slugs so numbers remain high/those without the mutation are eaten by slugs so numbers fall much more | [1] | |
| | | (iii) | Die out/become extinct | [1] | |
| | (c) | (i) | Y-axis correctly scaled [1]<br>all points correctly plotted [2]<br>(six points correctly plotted = 1)<br>lines joined point to point/appropriate best fit curve [1] | [4] | |
| | | (ii) | More plants with mutation over time | [1] | |
| | (d) | | Darwin | [1] | 13 |

| | AVAILABLE MARKS |
|---|---|

**9 Indicative content**

- ATC and G
- on its coding strand
- group of three bases/base triplet
- code for an amino acid
- different sequences of bases/different base triplets
- code for different amino acids
- amino acids joined together to make protein

| Band | Response | Mark |
|---|---|---|
| A | Candidates must use appropriate specialist terms throughout to describe how DNA codes for a wide range of proteins 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 DNA codes for a wide range of proteins using **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 DNA codes for a wide range of proteins using **one to three** 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

**10 (a) (i)** To allow oxygen to enter for respiration (by microorganisms)/to allow carbon dioxide to escape [1]

**(ii)** Peak of ammonia is before nitrate [1]

**(iii)** Decay/decomposition [1]

**(b)** Ammonia is converted to nitrate [1]
by nitrifying bacteria [1] [2] — 5

**11 (a) (i)** After 3 years/at end of trial no overall difference in survival [1]
those taken the drug initially survived longer [1]
correct use of data from the table [1] [3]

**(ii)** As a control/to eliminate the psychological effects of taking the drug [1]

**(iii)** So patients didn't know whether they had the drug or the control [1]

**(iv)** Volunteers [1]

**(b)** Licensing [1] — 7

**Total** — **75**