Rewarding Learning

General Certificate of Secondary Education
2014–2015

Science: Single Award

Unit 1 (Biology)

Higher Tier

[GSS12]

TUESDAY 12 MAY 2015, 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)** **(i)** Niamh [1]
received recessive alleles from both parents for blond hair/
and blue eyes/father did not pass on his dominant allele for brown
hair [1] **[2]**

(ii) As he carries a recessive allele for eye colour (and neither
parent has a recessive allele to give) **[1]**

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

(ii)

	T	t
T	T T	**Tt**
t	**Tt**	**tt**

Gametes correct [1]
Offspring correct [1] **[2]**

(iii) 3 **[1]**

(iv) Discontinuous **[1]** **8**

2 **(a)** **(i)** Doctors and nurses have close contact with infected patients **[1]**

(ii) In vitro [1]
animal [1] (in correct order)
both stages present but in wrong order [1] **[2]**

(b) **(i)** Active [1]
slow to act/long lasting [1] **[2]**

(ii) So it does not give the person the disease **[1]**

(iii) If the initial vaccination does not produce enough antibodies/
so antibody level reaches level of immunity **[1]** **7**

3 **(a)** **(i)** X in pancreas **[1]**

(ii) Lowers blood sugar levels [1]
as glucose is converted to glycogen/increased respiration/converted
to fat [1] **[2]**

(b) **(i)** No increase in percentage of people (with diabetes) with long term
effects between 40 and 160 arbitrary units of blood sugar [1]
sharp increase in percentage of people with long term effects from
160 – 200 arbitrary units of blood sugar [1] **[2]**

(ii) Blood sugar levels can fluctuate due to eating, exercise/
to check how much insulin to give themselves **[1]** **6**

4 Indicative content
- protein found in meat, nuts and seeds, seafood, beans and peas, poultry (named source)
- growth/repair
- place a little piece of the food in a test tube/boiling tube
- add Biuret reagent
- (if the Biuret reagent changes) colour from blue
- to purple/lilac/mauve then protein is present

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe how to carry out the food test investigation 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 must use appropriate specialist terms throughout to describe how to carry out the food test investigation 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 to carry out the food test investigation 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	Not worthy of credit.	[0]

[6]   6

5 (a) (i)

Fox		Owl
	Blue tit	
Mouse		
	Greenfly	
Grass		Leaves
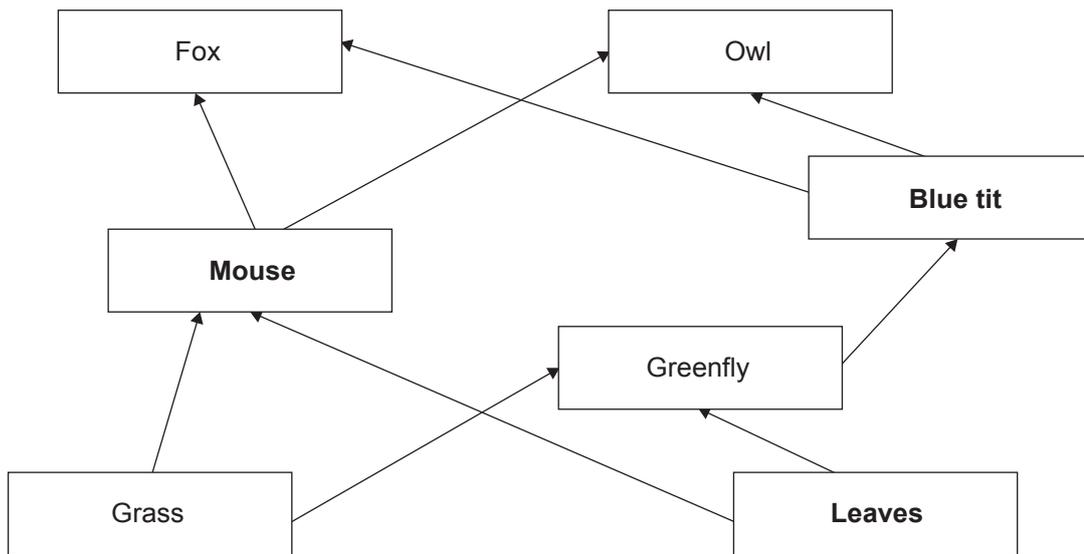
All organisms correct [2]
1/2 organisms correct [1]   [2]

(ii) 2   [1]

(b) (i) 1. Close to the top of the leaf
2. many chloroplasts
3. tightly packed together (Any order)   [3]

(ii) Through the pore   [1]   7

6 (a) (i) To show that it is antibiotic which is stopping growth of bacteria/
to act as a control   [1]

(ii) Antibiotic A [1]
Largest area with no growth of bacteria/largest clear area/
killed most bacteria [1]   [2]

(iii) Equal sized disks/same bacteria/same concentration of antibiotic   [1]

(b) Mutation [1]
in chromosomes/genes/DNA [1]   [2]

(c) (i) 15 – 3 = 12 [1]
12/15 x 100/1 = 80% [1]   [2]

(ii) Number of antibiotics developed has decreased over time   [1]   9

					AVAILABLE MARKS
7	**(a)**	**(i)**	Process A – decay/decomposition/rotting [1] Process B – nitrification [1]	[2]	
		(ii)	No/fewer dead plants/nitrate in soil taken in by plants then plants removed [1] for decay bacteria/for decay/ammonia production/less ammonia produced [1] less nitrification/less ammonia converted to nitrates [1]	[3]	
	(b)	**(i)**	Algae die [1] (bacteria) use up oxygen/fall in oxygen levels [1]	[2]	
		(ii)	Only spread sewage and slurry on farmland during growing season/don't spread slurry on wet days/make sure sewage and slurry are properly stored before use	[1]	
	(c)	**(i)**	Stonefly larvae and mayfly larvae [1] Sludge worm and rat tailed maggot [1]	[2]	
		(ii)	Slurry has been broken down (by bacteria)/slurry has been diluted/used by plants	[1]	11
8	**(a)**	**(i)**	3	[1]	
		(ii)	Cytosine	[1]	
		(iii)	A and T correctly paired up C and G correctly paired up	[1]	
	(b)	**(i)**	Advantage – new drugs could be made available to treat their condition/new therapies could be discovered/could find a new cure [1] Disadvantage – their personal information may be passed on to insurance companies and future employers [1]	[2]	
		(ii)	Could prolong their life/cannot make their diagnosis any worse/might help others	[1]	
	(c)		Franklin and Wilkins [1] (used X ray diffraction to show) overall shape of DNA/phosphate on outside [1]	[2]	8

9 **(a)** Any **three** from:
  • (dark variety of) peppered moth is decreasing
  • less soot on trees so dark moth are easier to spot
  • (more are) eaten by birds/predation
  • less of the dark variety survive to reproduce and pass on their genes
    so numbers decrease   [3]

  (b) **(i)** Any **two** from:
    • contradicts the teaching of the church
    • long time-scale involved
    • complex concept   [2]

  (ii) Change/adaptation in a species/type of organism/new species form [1]
    over time [1]   [2]

	AVAILABLE MARKS
	7

10 **Indicative content**
  • set up two flasks – one with a swan neck and one with neck broken
  • add broth to (each) flask
  • make sure the broth (and flasks) were sterilised at the start of the experiment
  • keep the flasks at the same temperature/same type of broth
  • leave the flasks for a set period of time
  • the broth in the flask with the swan neck did not become contaminated
  • the broth in the flask with the broken neck became contaminated
  • microorganisms trapped in the swan neck could not gain entry to the broth

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain how Louis Pasteur showed that contamination is caused by microorganisms, using **seven or 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 and explain how Louis Pasteur showed that contamination is caused by microorganisms, using **four, five or six** 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 and explain how Louis Pasteur showed that contamination is caused by microorganisms, using **one, two or three** 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	Not worthy of credit.	[0]

                                                                        [6]

	6

Total

	75