



**General Certificate of Secondary Education  
2018**

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**Double Award Science: Biology**

Unit B2

Higher Tier

**[GSD42]**

**FRIDAY 8 JUNE, MORNING**

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**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		
<b>1</b>	<b>(a) (i)</b>	(type of) exercise	[1]		
	<b>(ii)</b>	duration of exercise/intensity of exercise/recovery time	[1]		
	<b>(iii)</b>	before exercise/at rest; and after exercise	[2]		
	<b>(iv)</b>	beats per minute/bpm	[1]		
	<b>(v)</b>	repeat	[1]		
	<b>(b)</b>	reduces depression/reduces anxiety/less stress/increases lung capacity/ strengthened heart muscle/increased volume of blood pumped (per beat at rest)/less stress/less obesity/lower blood pressure/less risk of heart disease/ slows pulse/less risk of diabetes/reduces stroke/lowers heart rate/reduces fat/lose weight/lower cholesterol/increases O <sub>2</sub> uptake/stronger muscle/larger increases any named muscle/prevents heart attack	[1]	7	
<b>2</b>	<b>(a) (i)</b>	Jenner	[1]		
	<b>(ii)</b>	milkmaids who had cowpox; did not get smallpox/immune to smallpox	[2]		
	<b>(b) (i)</b>	C	[1]		
	<b>(ii)</b>	B and C	[1]		
	<b>(iii)</b>	immediate/don't have to wait for antibodies to be produced	[1]		
	<b>(iv)</b>	A	[1]		
	<b>(c)</b>	<ul style="list-style-type: none"> <li>• quicker to increase/steeper increase/straight away/faster production</li> <li>• level higher/more Ab's;</li> <li>• (remains higher) for longer/decreases slower</li> </ul>	[3]		10

3 (a) **Indicative content**

Any **five** from:

- cut out cylinders using **cork borer**;
- cut each cylinder to the **same length** (using a scalpel)/a given length;
- **weigh** (each cylinder)/put on balance/measure weight;
- place (one) cylinder in beaker of sugar solution/potato cylinder in beaker or solution;
- leave for a **time**/specified time/set timer;
- **dry** cylinders;
- **reweigh** cylinders

Band	Response	Mark
A	Candidates use appropriate terms throughout to give <b>at least five</b> points to describe how to carry out the experiment. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
B	Candidates use appropriate terms throughout to give <b>at least three or four</b> points to describe how to carry out the experiment. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
C	Candidates use appropriate terms throughout to give <b>one or two</b> points to describe how to carry out the experiment. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

(b) points plotted correctly = [2]

line joining points;

x-axis scale correctly drawn (must use over half the grid)

[4]

(c) Any **two** from:

- where the line crosses x-axis/goes through 0;
- there is no % change in mass;
- concentration of water or sugar solution outside is the same as inside the cylinder/6.6 inside and out;
- water is not moving in or out/no net water movement
- isotonic

[3]

13

AVAILABLE  
MARKS

			AVAILABLE MARKS
<b>4</b>	<b>(a)</b> Punnett; one parent Dd; second parent Dd; correct cross	[4]	11
	<b>(b)</b> purple and white; ratio 3 : 1 must have phenotypes to get ratio mark	[2]	
	<b>(c) (i)</b> Two Punnett squares; cross with homozygous recessive (in both); one cross with DD and other cross with Dd; correct crosses	[4]	
	<b>(ii)</b> Dd and dd	[1]	
<b>5</b>	<b>(a)</b> transpiration/photosynthesis/support/turgid/transport/cooling/solvent	[2]	11
	<b>(b)</b> timer/stopclock/clock/watch	[1]	
	<b>(c) (i)</b> bar taller than B	[1]	
	<b>(ii)</b> allow to settle/allow to acclimatise/allow to reach steady rate/adjust/ allow time for bubble to start to move	[1]	
	<b>(iii)</b> • Description: more water uptake in B than C/less in C than B • Explanation Stomata: more stomata on lower surface/less stomata on upper surface/more stomata blocked in C/less stomata blocked in B • water loss mark: more evaporation/more water loss/more transpiration/more diffusion in B/less diffusion in C	[3]	
<b>(d)</b> • rate of uptake decreases/bubble moves less; • (increased) humidity in the bag/water builds up in bag/or described; • less water loss/less transpiration/less evaporation/less diffusion/less gradient for water loss	[3]		

			AVAILABLE MARKS
6	(a) stage 1	[1]	5
	(b) zygote	[1]	
	(c) different (types of) cells made or produced/tissues/organs produced or made/when cells become specialised	[1]	
	(d) (i) large surface area/villi/good blood supply/short diffusion distance	[1]	
	(ii) urea/carbon dioxide/CO <sub>2</sub>	[1]	
7	(a) <b>genetically</b> identical	[1]	4
	(b) asexual	[1]	
	(c) mitosis	[1]	
	(d) can't adapt to changing environment/if parent has a (genetic) disease all offspring may have it/all susceptible to the same disease/if one gets a disease all will/may get it	[1]	
8	(a) one from type B; four from type B; no bacteria from the clear bacteria drawn (must have a mark from B above to get this mark)	[3]	4
	(b) isolation of patients (with MRSA)/testing for MRSA when patients enter hospital/(more) hand washing/use hand sanitisers/don't let visitors sit on beds/sterilise bed/floor/ward locker/mop up spills immediately/limit visitors/disinfectant use/use of gloves or apron/deep clean/wash surfaces/use antiseptic	[1]	
9	(a) (i) + (ii) <b>either order</b>		2
	<ul style="list-style-type: none"> <li>• less likely to be eaten/less predation/ less likely to be eaten by lynx or wildcat/ they survive/prevent decrease in numbers</li> <li>• camouflaged/harder to see/blending</li> </ul>	[2]	
	(b) (i) increases/more/goes up (brown or mutated ones)	[1]	5
	(ii) Any <b>two</b> (only two!) from:		
	<ul style="list-style-type: none"> <li>• more likely to survive/avoid predation/not eaten/camouflaged or converse for white;</li> <li>• to breed/reproduce/ref to offspring;</li> <li>• pass on genes/advantageous characteristic/allele/or described</li> </ul>	[2]	

- 10 (a) (i) • duplication/DNA replicated/chromosomes replicated/twice amount chromosomes;  
 • lined up/arranged in centre of cell [2]
- (ii) **identical** cells [1]
- (b) (i) parent cell with 2 black and 2 white;  
 2 chromosomes in each daughter cell;  
 between the 2 cells there are 2 black and 2 white [3]
- (ii) variation; haploid cells [2]
- 11 (a) chromosome: Down's syndrome;  
 gene: cystic fibrosis/Huntingtons/haemophilia/sickle cell/cancer/colour blindness [2]
- (b) (i) phosphate [1]
- (ii) base or example A,T,C,G [1]
- (c) • base pairing/bases occur in pairs/A with T **and** C with G;  
 • same amount of A as T } need both for 2nd mark  
 same amount of C as G } [2]
- (d) **Indicative content**

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D	Response not worthy of credit.	[0]

[6]

**Total**

AVAILABLE  
MARKS

8

12

**90**