



General Certificate of Secondary Education
2015

Double Award Science: Biology

Unit B2

Higher Tier

[GSD42]

FRIDAY 5 JUNE, 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.

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	Patient/s who is/are	Evidence	
Male	A;	Testosterone	;
Most likely to be a smoker	B;	CO/carbon monoxide	;
Most likely to be receiving IVF treatment	C;	Fertility hormones	;
Most likely to be a binge drinker	A;	High blood alcohol levels	;

[8]

AVAILABLE
MARKS

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2 Indicative content

Any **six** from:

- dip/soak **a** disc in an antibiotic or both discs
- set discs on agar
- incubate/more than 1 day/leave for 24 hrs or more
- at 25°C/less than 25°C/about 25°C
- seal/use sellotape/do not reopen
- autoclave/sterilise after/safe disposal/wipe benches with alcohol/disinfectant (before or after)
- **A** has a bigger clear area
- **A** kills **more** bacteria/prevents **more** growth/**more** bacteria destroyed

Response	Mark
Candidates give 5 or 6 points from the indicative content to describe how to set up the Petri dishes and interpret the results and give safety precautions for the investigation. They use good spelling, punctuation and grammar and form and style are of a high standard.	[5]–[6]
Candidates give 3 or 4 points from the indicative content to describe how to set up the agar plates or interpret results or give safety precautions for this investigation.	[3]–[4]
Candidates give 1 or 2 points from the indicative content to describe how to set up the agar plates or interpret results or give safety precautions for this investigation.	[1]–[2]
Response not worthy of credit.	[0]

[6]

6

			AVAILABLE MARKS		
3	(a) (i)	8%;	[1]	7	
	(ii)	No net movement of water/water is neither moving into or out of potato; Concentrations inside and outside are equal/isotonic;	[1]		
	(b) (i)	Turgid cell drawn; looks more turgid than in (ii);	[1]		
	(ii)	Correct label for cell wall must be a double line Correct label for cell membrane; Plasmolysed cell drawn/cell membrane pulled away from wall at all or some parts;	[1] [1] [1]		
	(c)	Cell wall = limits the entry of water/stops cell from bursting/stops lysis	[1]		
4	(a)	Any four from five points: • fat/fatty deposits/cholesterol in the blood vessel/coronary arteries • blockage/clot/reduces or stops the blood flow (to heart muscle) • less oxygen/glucose (reaches the heart muscle) • no or less respiration • Muscle cells die/cells die/heart stops beating /heart stops contracting	[4]		12
	(b) (i)	Any three from four: Reduction statement – cholesterol reduced with statins or reduced without statins/with diet; • statins reduce the cholesterol level from 6 to 3.8 units/by 2.2 units • without statins/cholesterol levels are reduced to 5.5/0.5 Comparison mark • statins reduce cholesterol levels more than without statins • statins reduce it faster /or difference from 5.5 to 3.8 or difference of 1.7 Maximum [2] for data (after 6 months)	[3]		
	(ii)	To compare this group with those that took statins/as a control /to see if diet alone can bring down cholesterol/to see if the statins make the level drop faster ;	[1]		
	(iii)	12 000 men; = 2000 women; Correct answer [2]	[2]		
	(iv)	Any two from: • Reduce salt intake/less salt • Exercise/more sport (described) • Reduce stress • Don't smoke/give up smoking • Don't binge drink/don't drink/drink less/no alcohol	[2]		

- 5 (a) Any **three** from:
- Remove the **gene for insulin**
 - Remove the plasmid (from the bacterium)
 - Cut the plasmid open/split the plasmid open
 - Insert insulin gene (into plasmid/bacterial DNA) [3]
- (b) The bacteria reproduce/clone themselves/bacteria put into a fermenter/bioreactor; [1]
- (c) Any **two** from:
- human insulin has no side effects/no allergic reactions/no rejection
 - don't have to kill/harm any animals/no ethical issues; [2]
- (d) Diabetes; [1]

AVAILABLE
MARKS

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- 6 (a) (i) Potometer [1]
- (ii) Use the syringe; [1]
- (b) (i) Air bubble drawn in correctly/right hand side of the bubble must start at 6; [1]
- (ii) 8mm [1]
- (c) 8; [1]
- (d) (i) Fan **or** wind; [1]
- (ii) Bubble move less/decreases/bubble doesn't move at all; [1]

(e) **Indicative content**

Any **five** from:

- warmer/temperature higher in 4;
- windier/the fan is on in 4;
- **more** evaporation (inside the air spaces or cells in leaf);
- **more** diffusion (inside the air spaces or cells in leaf);
- **higher** rate of transpiration/more transpiration
- through the stomata
- maintain diffusion gradient

Response	Mark
Candidates must use appropriate specialist terms throughout to describe and compare the results for experiments 1 and 4 and what happens in the leaf to bring about these results (using five or more of the above points). They use good spelling, punctuation and grammar and form and style are of a high standard).	[5]–[6]
Candidates use some appropriate specialist terms to describe and compare the results for experiments 1 and 4 and what happens in the leaf to bring about these results (using three or four of the above points). They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates give one or two points and partially describe the results in experiments 1 and 5. They use limited spelling, punctuation or grammar skills).	[1]–[2]
Response not worthy of credit.	[0]

[6]

AVAILABLE
MARKS

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							AVAILABLE MARKS	
7	(a)	(i)	Bacteria;			[1]		
		(ii)	Bacteria are not killed by antibiotics;			[1]		
	(b)	(i)	Health Trust Western	2010 decreased	2011 increased	2012 decreased		[1]
		(ii)	Northern;			[1]		
		(iii)	20 – 4 or 20 (cases) to 4 (cases)/or reduction of 16 = [1] = 80%			[2]		
			Correct answer [2]					
		(iv)	Any two from:					
			<ul style="list-style-type: none"> • pretest patients • isolation of patients (with MRSA) • protective clothing when dealing with patients with MRSA/wear gloves/goggles etc • washing hands between dealing with patients/washing hands more frequently • deep clean wards/sterilising surfaces or equipment/cleaning toilets/floors/hospital/wards more frequently/mop up spills • use hand sanitiser; 			[2]		
						8		
8	(a)	(i)	Genetically identical;			[1]		
		(ii)	They may have been grown in different (environmental) factors/ described			[1]		
		(iii)	Mitosis;			[1]		
	(b)	(i)	Genetic variation/different genes or alleles or mixture of genotypes;			[1]		
		(ii)	Continuous;			[1]		
						5		
9	(a)		6 chromosomes; 3 pairs (but don't have to be lined up in pairs);			[2]		
	(b)	(i)	Ovaries/testes;			[1]		
		(ii)	4;			[1]		
		(iii)	(Need to restore) 46/diploid (number);			[1]		
	(c)	Franklin and Wilkins – X-ray/diffraction/crystallography; Chargaff – base pairs/relative amounts of each base pair/A = T/C = G; Watson and Crick – 3D model;				[3]		
						8		

- 10 (a) Any **two** from:
- vaginal secretions
 - stomach acid
 - ear wax
 - blood clots (at wound to prevent entry)
 - mucous membranes
 - tears/lysozymes
 - **nasal** hairs
 - skin (is physical barrier to entry);

[2]

- (b) Any **two** from three:

- **antigens** on microorganism;
- trigger **WBC/lymphocyte**;
- antibodies are complementary in shape to the antigens

[2]

- (c) **Steeper** gradient;

higher antibody level (higher than the peak already drawn);
stays high – for longer than original;

[3]

7

- 11 (a) Punnett square  ; gametes correct; × 2; correct cross; [4]

	B	b
B	BB	Bb
b	Bb	bb

- (b) (i) Baby won't have sickle cell anaemia unless **both** parents are carriers/
unless it has two b/two recessive alleles, i.e. one allele from each parent/
If mother doesn't have the gene/allele there is **no chance** of the baby
having it [1]

- (ii) more cost-effective/save time; [1]

- (c) Any **three** from:

- have advantageous characteristic/allele/beneficial to be a carrier/or
described people who are carriers/don't get malaria if bitten;
(**NOT** natural protection as advantageous mark – already in question)
- more sickle cell carriers survive
- to reproduce/reproductive age;
- pass on allele/gene/carrier gene/characteristic/trait

[3]

9

Total**90**