



General Certificate of Secondary Education
2018

Double Award Science: Biology

Unit B2

Higher Tier

[GSD42]

MONDAY 12 NOVEMBER, 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)	placenta	[1]	6
	(ii)	large surface area/villi	[1]	
	(iii)	carbon dioxide/urea	[1]	
	(b)	umbilical cord	[1]	
	(c)	amnion/amniotic fluid; protection/cushions/support	[2]	
2	(a)	100 – 66 = 34; 34 ÷ 24; = 1.4 1.41/1.42 = max [2]	[3]	8
	(b)	Any four from: • less leaves in B; • less surface area in B; • less diffusion; • implied (less) stomata in B; • less evaporation; (4 × [1])	[4]	
	(c)	stop water being lost from the beaker /so that water only lost from leaves	[1]	
3	(a) (i)	white blood cell/lymphocytes; produce antibodies; to match/complementary antigen; antibodies lock onto antigen/antibody and antigen come together	[4]	9
	(ii)	immobilise/stop spreading of microorganism/stops them reproducing	[1]	
	(b) (i)	phagocytosis	[1]	
	(ii)	phagocytes/WBC	[1]	
	(iii)	surround/engulf; digest/breakdown (of the clump);	[2]	
4	(a)	oestrogen	[1]	7
	(b) (i)	menstruation/period/menstrual bleeding	[1]	
	(ii)	uterus lining breaks down; lining/blood/egg passes out/removed from body/shed	[2]	
	(c) (i)	ovulation	[1]	
	(ii)	ovum/egg released; from the ovary/into oviducts	[2]	

- 5 (a) due to vaccination;
those vaccinated will then be 20/girls vaccinated will now be 20 [2]
- (b) $1760 \div 32/55$;
 $55 \times 100 \div 5500$ [2]
- (c) AIDS/HIV/herpes [1]
- (d) (i) condom/female condom [1]
- (ii) changes hormone level/contains named hormone;
stop development/release/production of ova/stops ovulation [2]

AVAILABLE
MARKS

8

6 **Indicative content**Any **six** from:

- plasmolysed;
- cells shrink;
- vacuole decreases;
- cell membrane pulls away from cell wall;
- water has moved out from the potato;
- from where more water inside to less water outside/or from where
- less concentrated sugar solution to a more concentrated sugar solution;
- across a selectively/semi-permeable membrane

Response	Marks
Candidates use appropriate terms throughout to give at least five points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
Candidates use appropriate terms throughout to give at least three or four points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
Candidates use appropriate terms throughout to give one or two points from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

[6]

6

		AVAILABLE MARKS									
7	(a) spontaneous generation	[1]									
	(b) to kill microorganisms/sterilise broth	[1]									
	(c) Any two from:	[1]									
	• broth stayed clear;										
	• microorganisms were trapped in the bend;										
	• did not enter the broth;										
	• no growth/reproduction of microorganisms										
	(2 × [1])	[2]									
	(d) Any two from:	[2]									
	• microorganisms entered;										
	• from the air;										
	• microorganisms grew/reproduced;										
	(2 × [1])	[2]									
8	(a) (i) clones	[1]									
	(ii) asexual	[1]									
	(b) (i) doubled/replicated	[1]									
	(ii) haploid	[1]									
	(iii) independent assortment/crossing over	[1]									
9	(a) (i) DD and Dd	[1]									
	(ii) dd	[1]									
	(iii)										
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	D	d									
D	DD	Dd									
d	Dd	dd									
	Punnett square drawn; Dd for both; cross	[3]									
	(iv) two crosses; both with dd; 1 cross with Dd; other cross with DD	[4]									
	(b) increase in pale moths pale moths camouflaged/dark moths not camouflaged; pale moths not eaten/dark eaten; pale survive to reproduce/dark don't reproduce; pale pass on their genes to their offspring	[4]									
		7									
		5									
		13									

10 (a)	taking blood pressure 2 mins to 4 mins [1] cleaning patient's wound 4 mins to 8 mins [1] talking to the patient 0 mins to 2 mins [1]	[3]	
(b) (i)	area where bacteria have been killed/no bacteria	[1]	
(ii)	Z; biggest clear area/killed most bacteria	[2]	
(iii)	C	[1]	
(iv)	B; none of the antibiotics have killed the bacteria/no clear areas	[2]	
(v)	MRSA/C. diff.	[1]	10
11	1: gene is taken out of the human DNA [1] 3: Plasmid is cut open [1] 4: Plasmid is joined to the human gene/gene inserted into plasmid [1] 6: The bacteria replicated/multiplied/reproduced/mitosis/clone; with the modified plasmids in each bacterium/produce hormone [2]	[5]	5

12 Indicative content

Chargaff;
base pairing rule/described;

Franklin/Wilkins;
X-ray crystallography;

Watson/Crick;
3D model of DNA

Response	Marks
Candidates use appropriate terms throughout to give at least five points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
Candidates use appropriate terms throughout to give at least three or four points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
Candidates use appropriate terms throughout to give one or two points from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

[6]

Total

6

90