



General Certificate of Secondary Education
2016

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

FRIDAY 10 JUNE, 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.

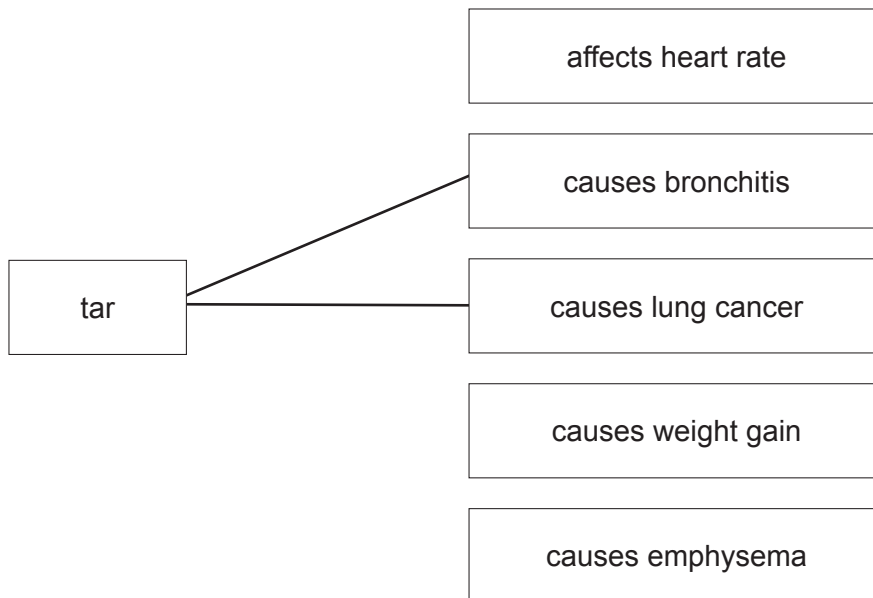
The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

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.

1 (a)



(b) (i) nicotine

(ii) carbon monoxide/CO

2 (a) evaporation;
stomata/stoma

(b) (i) increases/quicker;
increases/quicker;
increases/quicker;
decreases/slower;

(ii) potometer
bubble potometer/weight potometer

(c) photosynthesis/support/turgor/transport

AVAILABLE
MARKS

[2]

[1]

[1]

4

[2]

[4]

[1]

[1]

8

			AVAILABLE MARKS	
3	(a)	(i) A = aorta B = renal artery (need both) C = vena cava (need both)	[3]	16
		(ii) up (vena cava or at C) arrow on or beside the vertical	[1]	
		(iii) D = lungs E = liver	[2]	
		(iv) atria/atrium; ventricles/ventricle	[2]	
	(b)	(i) as lumen gets bigger so does flow rate or converse	[1]	
		(ii) capillaries	[1]	
		(iii) artery/aorta/named artery (except pulmonary artery)	[1]	
		(iv) valves	[1]	
	(c) Any four from: blockage/clot reduced blood flow/diameter of blood vessel decreases; less oxygen/glucose; less respiration; (brain) cells die	[4]		
	4	(a) Any three from: Luke's pulse before (is 10 bpm) lower than James or converse; Luke lower pulse rate after exercise (10 bpm) lower than James or converse; Luke recovery time quicker or converse for James Luke recovers 5 mins earlier; or converse for James;	[3]	
(b) strengthened heart muscle/heart stronger/builds up heart muscle; increased volume of blood pumped per beat/heart becomes more efficient/ blood can get around in fewer beats/lower pulse rate heart attack less likely/CHD less likely		[2]		
5	(a) sterilise/kill bacteria/disinfect/destroy micro-organisms	[1]	5	
	(b) microbes/bacteria/fungus/moulds; can enter/contaminated from the air	[2]		
	(c) 1. sealed so that bacteria cannot get out 2. any pathogens do not grow as well/so that dangerous organisms can't grow	[2]		

			AVAILABLE MARKS
6	(a) 1–5	[1]	4
	(b) ovulation; egg released from the ovary ;	[2]	
	(c) remains thick/doesn't come away/doesn't break down	[1]	
7	(a) umbilical cord	[1]	5
	(b) (i) function : exchange of materials (named with correct direction) adaptation : large surface area/folding/villi/good blood supply/thin	[2]	
	(ii) carbon dioxide/urea	[1]	
	(c) amnion/amniotic fluid/amniotic sac	[1]	
8	(a) (i) any antigen labelled	[1]	8
	(ii) antigen/microbe is recognised as foreign ; WBC/lymphocytes; produce antibodies; antibodies attached to antigen/antibody has a complementary shape	[3]	
	(iii) stops microbes spreading/stops reproducing easier phagocytosis	[1]	
	(b) phagocytosis; engulf; digest/(accept destroy using enzymes)	[3]	
9	(a) (i) years on x-axis; points plotted correctly points joined straight lines point to point	[4]	
	(ii) number of people living with AIDS increases with time from 2006 to 2013	[1]	
	(b) (i) $2.2 - 1.9 = 0.3 / \frac{1.9}{2.2} / 86.36$; $= 13.64\%$ or 13.6 ;	[2]	
	(ii) Any two from four more money spent on treatment/education/research; more people receiving; fewer new infections; more people living with AIDS;	[2]	
	(c) (i) Jenner	[1]	
	(ii) smallpox	[1]	11

10 no clear area around amoxicillin; clear area around neomycin
 Explanation: amoxicillin didn't kill X;/X is resistant to amoxicillin
 Neomycin kills X/X is not resistant to neomycin [4]

11 (a) Any **two** from:
 fails to produce sex **hormones** (or named hormone)
 blocked oviducts
 mucus hostile to sperm
 STI or named STI
 unable to produce eggs
 radiotherapy or chemotherapy [2]

(b) **Indicative Content**
hormones given/fertility hormones given;
 to increase ova production/egg production/super ovulation;
 eggs collected/gathered/harvested;
 from the ovaries;
 sperm added to ova/eggs;
 fertilisation/**nucleus** of sperm fuse with **nucleus** of ova/in Petri dish;
 kept until 8 cell stage/ensure normal development/divide by mitosis;
embryos inserted into the uterus;
 (Any **six** points) [6]

Band	Response	Mark
A	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]
B	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]
C	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]
D	Response not worthy of credit.	[0]

AVAILABLE MARKS
4
8

			AVAILABLE MARKS									
12 (a)	Description: level raised; Direction: water moves; from dilute to a more concentrated solution; through a selectively permeable membrane;	[3]	5									
(b)	vacuole has shrunk; cell membrane pulled away from the cell wall	[2]										
13 (a)	Punnett; RR for parent; parent Rr; correct offspring;	<table border="1" style="border-collapse: collapse; margin: auto;"> <tr> <td style="border: none;"></td> <td style="border: none; text-align: center;">R</td> <td style="border: none; text-align: center;">R</td> </tr> <tr> <td style="border: none; text-align: center;">R</td> <td style="text-align: center;">RR</td> <td style="text-align: center;">RR</td> </tr> <tr> <td style="border: none; text-align: center;">r</td> <td style="text-align: center;">Rr</td> <td style="text-align: center;">Rr</td> </tr> </table>		R	R	R	RR	RR	r	Rr	Rr	[4]
	R	R										
R	RR	RR										
r	Rr	Rr										
(b) (i)	3:1	[1]	7									
(ii)	discontinuous	[1]										
(iii)	blood groups/tongue rolling/attached ear lobes/eye colour/gender	[1]										
Total			90									