

Ce	Centre Number	
71		

Candidate Number

General Certificate of Secondary Education 2013-2014

Science: Single Award

Unit 1 (Biology) **Higher Tier**

[GSS12]



WEDNESDAY 13 NOVEMBER 2013, AFTERNOON

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper. Answer all ten questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 75.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question. Quality of written communication will be assessed in questions 4(a) and 10(a).

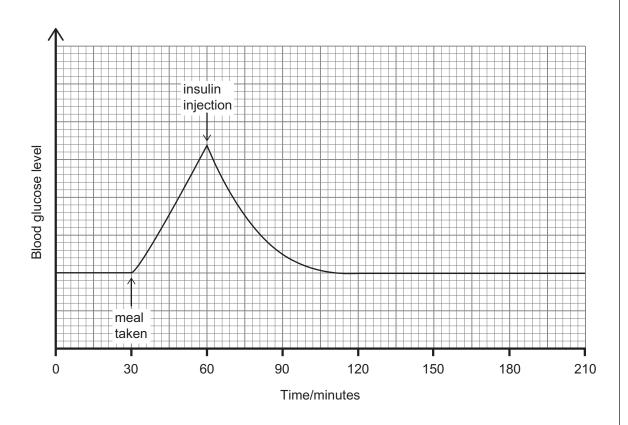


For Exa	miner's only
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Total	
Marks	



(a) The graph below shows how the blood glucose level in a person with diabetes changes because of a meal and an insulin injection.



(i) Describe and explain the effect of the insulin on blood glucose level.

______[2]

(ii) Use the information provided to suggest which type of diabetes (Type 1 or Type 2) the person has. Explain your answer.

_____[1]

i)	Put these trials (clinical, in-vitro and animal) in the order the take place.	у	
		[1]	
(ii)	Describe what in-vitro testing is and suggest why it is a very expensive process.		
		[2]	

2 The red squirrel is at risk of extinction in Ireland. There are many reasons for its decline but a major factor has been the introduction of the grey squirrel (a competitive invasive species) into Ireland from North America. In comparison to the red squirrel, grey squirrels are a common woodland animal and their numbers are increasing rapidly.

Examiner Only

Marks Remark

The table below includes some information about red and grey squirrels.

Feature	Red squirrel	Grey squirrel
Average body length	21 cm	26 cm
Average body mass	290 g	600 g
Habitat	coniferous (e.g. pine) forest	all types of forest
Feeding area	in the trees	in the trees and on the ground
Diet	ripe berries, nuts and seeds	ripe and unripe berries, nuts and seeds
Response to poxvirus	not immune to virus	immune to virus (but can carry it and spread it to other squirrels)

- (a) Use the information provided to answer parts (i), (ii) and (iii).
 - (i) Suggest **three** reasons for the grey squirrel being able to outcompete the red squirrel.

1		

2.		

3.		

[31
•	-

	(ii)	Suggest one reason why grey squirrels are much more likely to be killed by motor vehicles than red squirrels. [1]	Examiner O Marks Rer	nly mark
	(iii)	Suggest one thing that could be done to increase the number of red squirrels. [1]		
(b)		e two things that all competitive invasive species have in common.		
	2	[2]		

3	(a)	Cystic fibrosis is an inherited disease. Jack and Jill are heterozygous
		(carriers) for cystic fibrosis but do not have the condition.

er Only
Remark

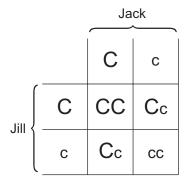
(i) What is meant by the term inherited disease?

[1

(ii) Using the information provided, explain how you know the allele for cystic fibrosis is recessive.

		r/

(b) The following Punnett square shows how Jack and Jill could have a child with cystic fibrosis.



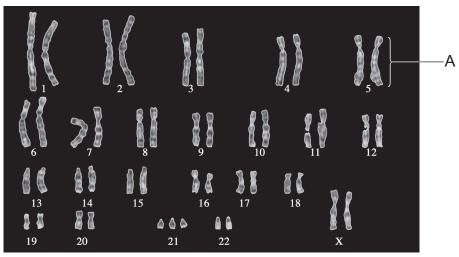
- (i) Circle the genotype for cystic fibrosis in the Punnett square. [1]
- (ii) How many different genotypes are shown in the Punnett square?

6

_____[1]

(c) The photograph below shows a human karyotype.

Examiner Only				
Marks	Remark			



© Look at Sciences / Science Photo Library

(i)	What does structure A represent?	
		[1

(ii) What genetic disorder is shown by this karyotype? Explain your answer.

[2

4 (a)	Describe how you would carry out an investigation to show that ligh needed for photosynthesis.	t is Examiner Only Marks Remark
	 In your account you should describe: the experimental set-up the results you would expect how the results show that light is necessary. 	
	In this question you will be assessed on your written communication skills including the use of specialist scientific terms.	
		_
		[6]
(b)	State two ways in which palisade cells are adapted for the process photosynthesis.	of
	1	
	2	
		[2]

5 The holly tree produces evergreen leaves (leaves that remain on the tree all year). The leaves also have sharp protective spikes at their edges as shown in the photograph below.

Examiner Only				
Marks	Remark			
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Source: Photo: Chief Examiner

(a) Suggest one advantage to the holly tree in having:

(i)	evergreen leaves.	
\-'/		

		[4
		- 11

(b) Pupils in a class collected a sample of leaves from a holly tree and counted the number of spikes on each leaf. Their results are shown in the table below.

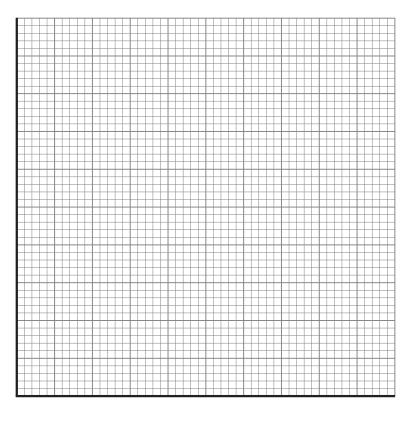
Examiner Only				
Marks	Remark			

Number of spikes on leaf	Number of leaves
7	2
8	4
9	14
10	19
11	12
12	14
13	10
14	6
15	3
16	2

The pupils want to draw a graph of this information. They have to decide which is the best type of graph to use, e.g. bar chart, line graph or pie chart.

(i) On the grid opposite, **scale** and **label** the axes for the most appropriate graph type.

(Note: you do **not** need to draw in the bars/points).



Examiner Only				
Marks	Remark			

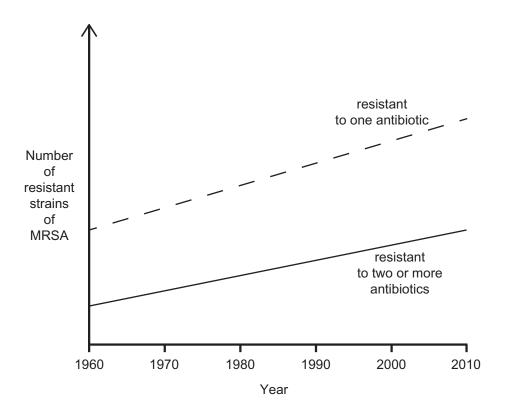
[2]

(ii) The variation shown by the holly leaves is discontinuous. Describe what discontinuous variation is.

______[1]

6 (a) MRSA is a type of bacteria resistant to antibiotics. The graph below gives information on resistant strains of MRSA.





1	(i)	Give two	trends	shown	hy th	e info	rmation	in	the	graph
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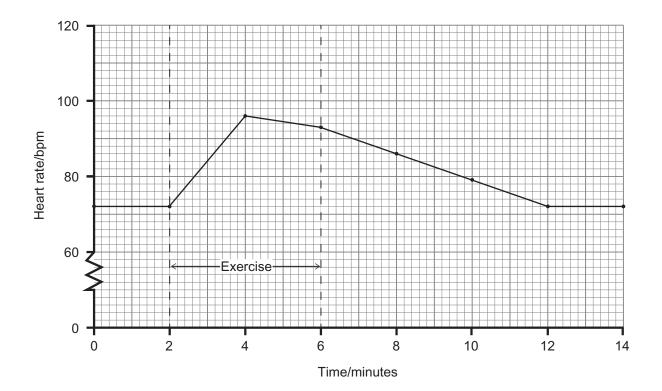
_______[2]

(ii) As part of their attempts to combat MRSA, scientists identify and classify the new strains as they appear. Suggest **one** reason why it is important to identify and classify the new strains of MRSA.

______[1

(D)		SA is found on the skin of many people. However, it only cause ction if it can get into the blood.	5	Examin Marks	er Only Remark
	(i)	Suggest one reason why most infections of MRSA take place hospitals.	in		
	(ii)	Suggest two measures that are used to restrict the spread of MRSA in hospitals.			
		1. 2.	[2]		
(c)		plain fully in terms of changes within bacteria, how antibiotic stance develops.			
			_ [4]		

7 (a) The graph below shows the effect of exercise on a student's heart rate. The student was unfit and usually did no exercise.



(i) Calculate the maximum percentage increase in heart rate caused by the exercise.

(Show your working out.)

% [3]	
the	
F41	

Examiner Only

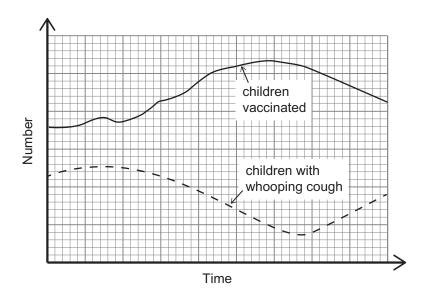
Marks Remark

(ii) During the exercise the student began to tire. What is the evidence from the graph that shows this?

_____[1]

(b)	The fitte		Examin Marks	er Only Remark	
	(i)	Compared to the graph opposite, suggest one change this will have on the student's heart rate if the exercise is repeated.			
			[1]		
	(ii)	Describe fully how regular exercise benefits the heart.			
			[3]		

8 Whooping cough is an infectious disease mainly affecting young children and is easily spread by coughing.



(a) Describe and explain the relationship between the number of children vaccinated and the number of children with whooping cough.

[2]

(b) Whooping cough can often cause epidemic outbreaks.

(i) What is meant by the term 'epidemic'?

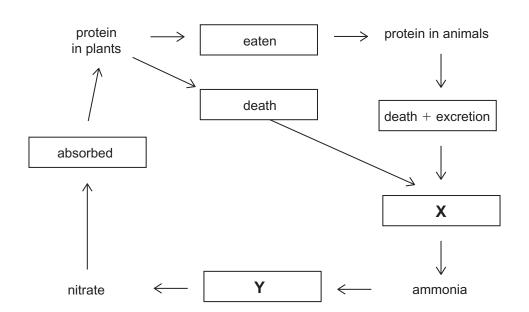
______[1]

(ii) Suggest why whooping cough can cause epidemic outbreaks.

_____[1]

nis recovery occu	irs.			
			[3]	
			[9]	

9 The diagram shows part of the nitrogen cycle.



(a)	Name th	he processes	labelled X	and \boldsymbol{Y}	in the	diagram
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X	
Υ	 [2]

(b) Farmers add fertiliser (a source of nitrate) to fields that are used for crop plants. Use the diagram and your knowledge to explain why this is necessary.

_____ [3]

Examiner Only

Marks Remark

	[2]	

	structure of DNA was worked out by Francis Crick and James Wats und 60 years ago following earlier work by other scientists.	son	Examiner Only Marks Remark
(a)	Describe how Crick and Watson worked out the structure of DNA, building on the work of earlier scientists. Your answer should name the earlier scientists involved and explain how they contributed to the understanding of the structure of DNA.		
	In this question you will be assessed on your written communication skills including the use of specialist scientific terms.		
(b)	Scientific discoveries such as working out the structure of DNA are subject to 'peer review'. Give two benefits of 'peer review'.	[6]	
	1. 2.		
		[2]	

(c)	(i)	The genetic modification of crops builds on the collaborative work of Crick and Watson and other scientists.	Examiner Marks I	r Only Remark
		Describe fully what a genetically modified (GM) crop is.		
		[2]		
	(ii)	Some varieties of GM crops can grow on much drier land than the normal varieties. Suggest one advantage of this. Explain your answer.		
		[2]		
_				
	тн	IS IS THE END OF THE QUESTION PAPER		

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