



General Certificate of Secondary Education
2014–2015

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--	--

Science: Single Award

Unit 1 (Biology)
Higher Tier

[GSS12]

TUESDAY 24 FEBRUARY 2015, MORNING



TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

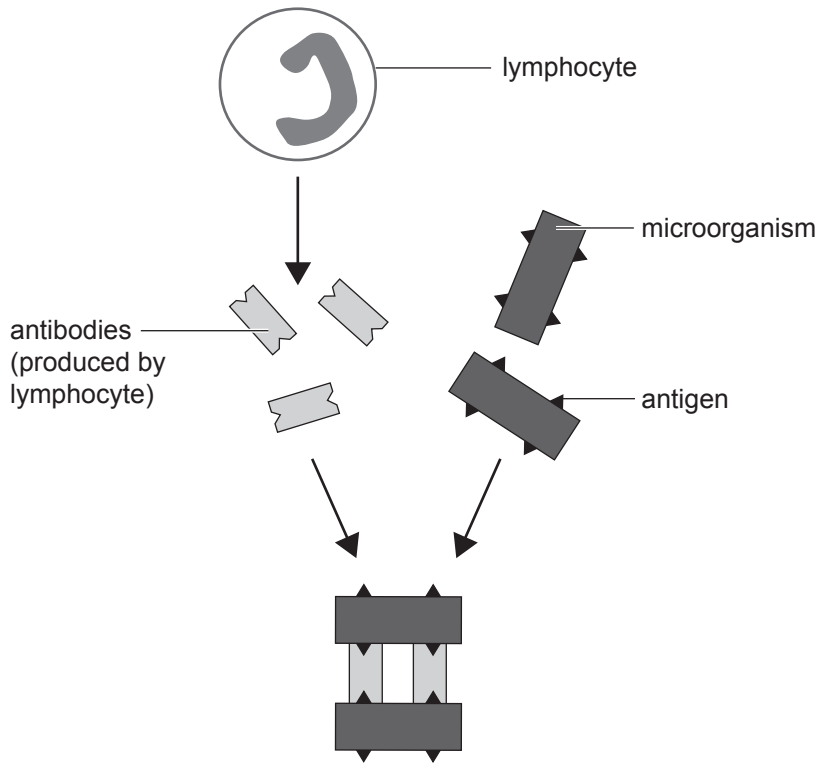
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all ten** questions.

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 Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total Marks	

1 (a) The diagram below shows how lymphocytes (white blood cells) produce antibodies in response to infection by microorganisms.



© GCSE Science Single Award For CCEA by James Napier, Alyn G. McFarland, Roy White, publisher Hodder Education (2013). ISBN: 9781444195729. Reproduced by permission of Hodder Education.

(i) Using the diagram and your knowledge, describe and explain how antibodies fight infection.

[3]

(ii) Another type of white blood cell also fights infection by phagocytosis. Describe the process of 'phagocytosis'.

[2]

Examiner Only	
Marks	Remark

- 2 (a) Albinism is an inherited condition in which affected individuals are unable to make the skin pigment melanin. The melanin gives skin its colour, but more importantly, helps protect against the Sun's harmful UV rays.

Albinism is caused by a mutation in the gene that controls the production of melanin.

- (i) Name the core component in a gene that is damaged in a mutation.

_____ [1]

- (ii) Explain fully why people with albinism are advised to stay out of strong sunlight.

_____ [2]

Examiner Only	
Marks	Remark

(b) The allele that causes albinism is recessive to the normal allele.

(i) Complete the genetic diagram below to show the offspring of a cross between two parents who are **heterozygous** for albinism.

Use the symbols: A = normal allele; a = albino allele

		a
A	AA	

[2]

(ii) Give the genotype that causes albinism.

[1]

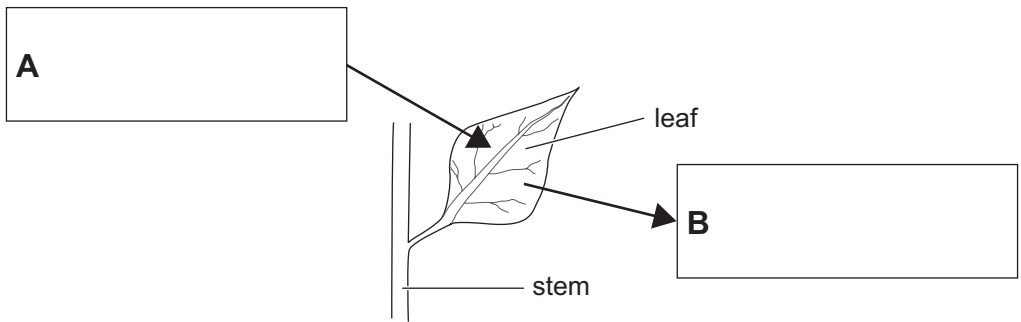
(iii) From the genetic diagram, what is the probability of a child **not** having albinism?

[1]

Examiner Only	
Marks	Remark

3 (a) The diagram below shows a leaf from a plant in darkness.

(i) Complete the diagram by naming the gases that enter (A) and leave (B) the leaf during **darkness**.

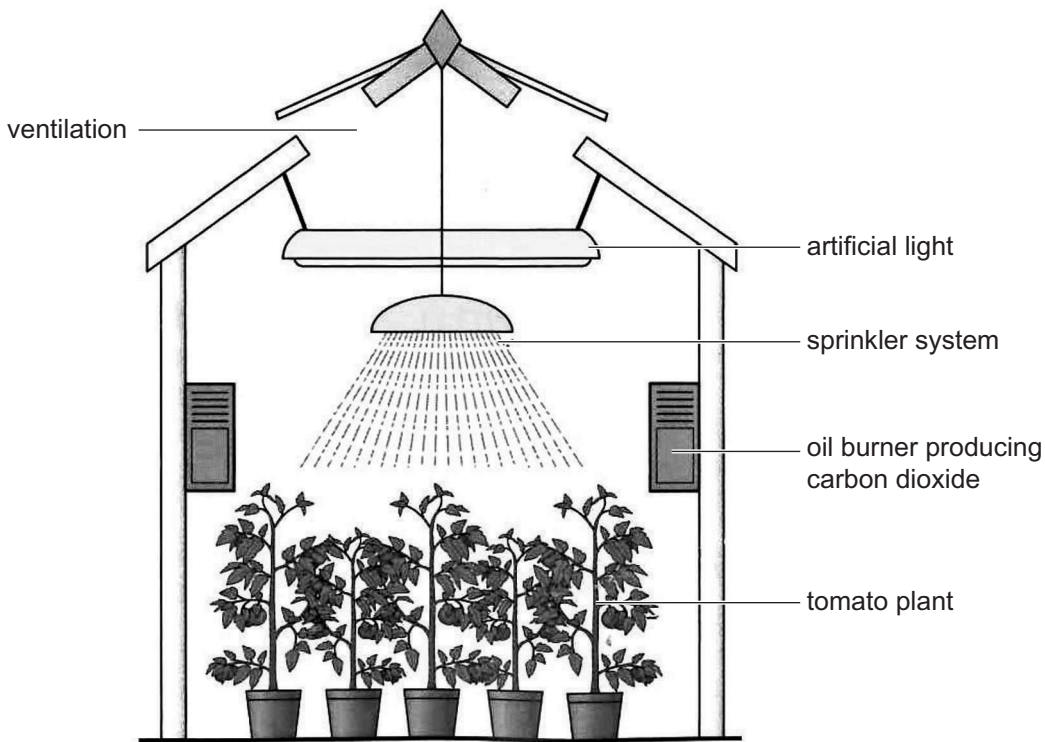


[1]

(ii) Name the process that causes this gas exchange.

[1]

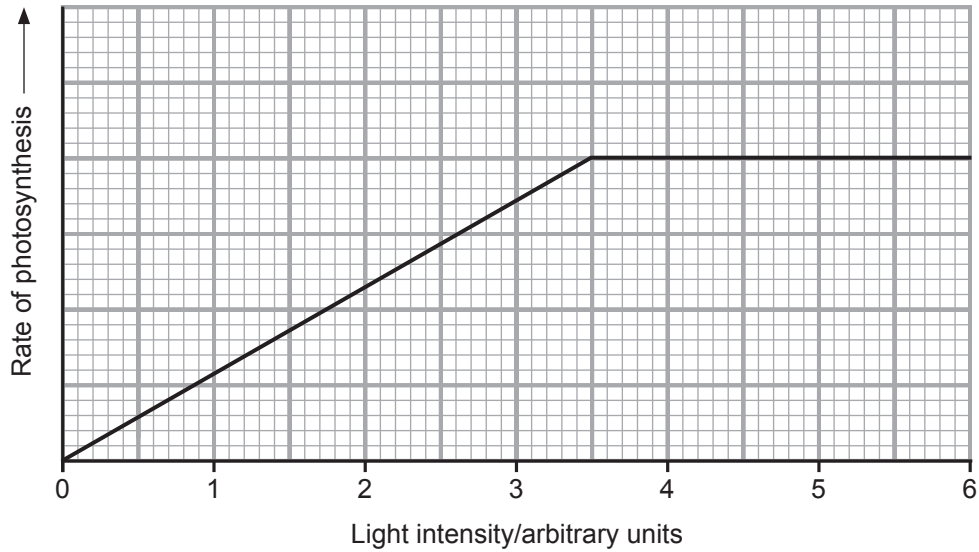
(b) The diagram below shows tomato plants growing in a glasshouse.



© GCSE Biology for CCEA by James Napier, publisher Hodder Education (2011). ISBN: 9780340983805. Reproduced by permission of Hodder Education.

Examiner Only	
Marks	Remark

The graph below shows the effect of light intensity on the rate of photosynthesis in tomato plants in a glasshouse. In glasshouses, the light intensity can be increased by using artificial lighting.



- (i) From the graph, state the best light intensity to use that would give the most profit if the tomatoes were grown for sale. Explain your choice.

Light intensity _____ arbitrary units

Explanation _____

 _____ [2]

- (ii) Apart from artificial lighting to increase light intensity, explain **one** other way in which glasshouses are adapted for increasing the rate of plant growth.

 _____ [1]

Examiner Only	
Marks	Remark

- 4 (a) Describe how you could investigate the effect of planting density (the number of seedlings in a pot) on plant growth.

Examiner Only	
Marks	Remark

Your answer should also include:

- **two** things that make the results valid (fair test)
- a description and explanation of the results you would expect.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

[6]

- (b) The grey squirrel is a competitive invasive species.

(i) Name **one** other competitive invasive species.

_____ [1]

(ii) Suggest **one** feature that all competitive invasive species have in common.

_____ [1]

- 5 (a) The table below shows the amount of some food groups in **100 g** of a soft drink.

Food group	Amount/g
protein	0.10
sugar (carbohydrate)	13.00
fat	0.11
fibre	0.20
iron (mineral)	0.09

- (i) Name the food group that is present in the smallest quantity.

_____ [1]

Not all the food groups contained in the drink are given in the table.

- (ii) Calculate the percentage of those shown.

_____ % [1]

- (iii) Suggest what makes up most of the rest of the drink.

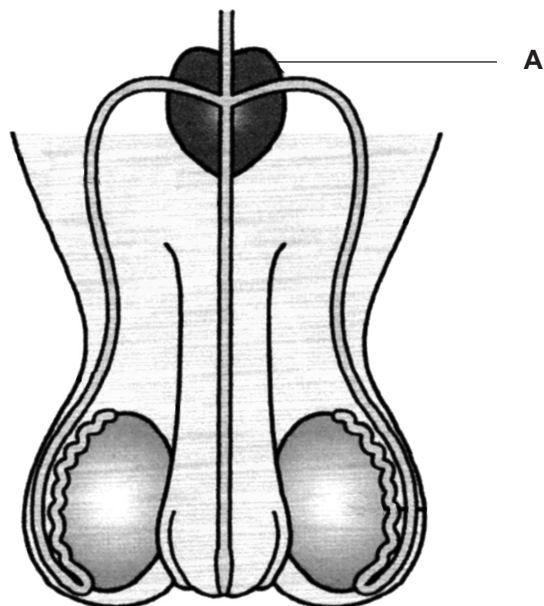
_____ [1]

- (b) Name the hormone that the body would produce after taking this drink. Explain your answer.

 _____ [2]

Examiner Only	
Marks	Remark

6 (a) The diagram below shows the male reproductive system.



© GCSE Science Single Award For CCEA by James Napier, Alyn G. McFarland, Roy White, publisher Hodder Education (2013). ISBN: 9781444195729. Reproduced by permission of Hodder Education.

(i) Name and give the function of the structure labelled **A**.

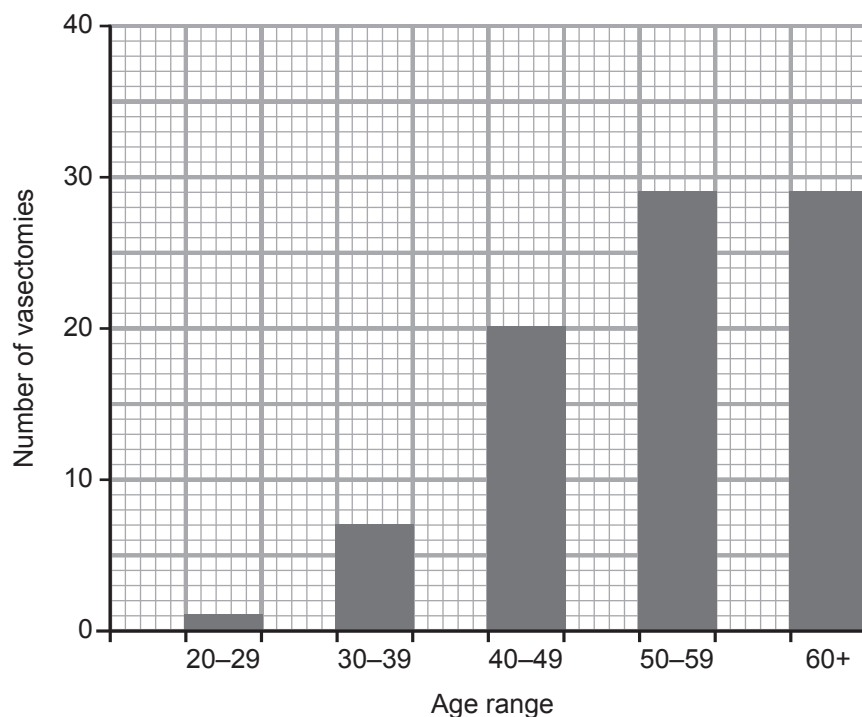
Name _____

Function _____ [2]

(ii) Label with the letter **X**, the parts of the reproductive system that are cut during a vasectomy. [1]

Examiner Only	
Marks	Remark

- (b) The bar chart below shows the number of men, in particular age groups, who have had vasectomies in a hospital in one year.



- (i) Describe fully the trend shown by this information.

[2]

- (ii) Suggest **one** reason why no men under 20 years old had a vasectomy.

[1]

- (c) Progesterone is a reproductive hormone produced in females. Describe and explain **one** function of progesterone.

[2]

Examiner Only	
Marks	Remark

- 7 (a) Atmospheric carbon dioxide levels were recorded every five years from 1980 to 2000 as shown in the table below.

Atmospheric carbon dioxide/parts per million (ppm)			
Year	Annual average	Summer average	Winter average
1980	342	337	348
1985	348	343	353
1990	354	350	359
1995	359	353	363
2000	365	360	369

- (i) Predict what the **annual average** value for carbon dioxide would have been in 2010.

_____ ppm [1]

- (ii) Describe the difference between the winter and summer averages. Suggest **one** reason for this difference.

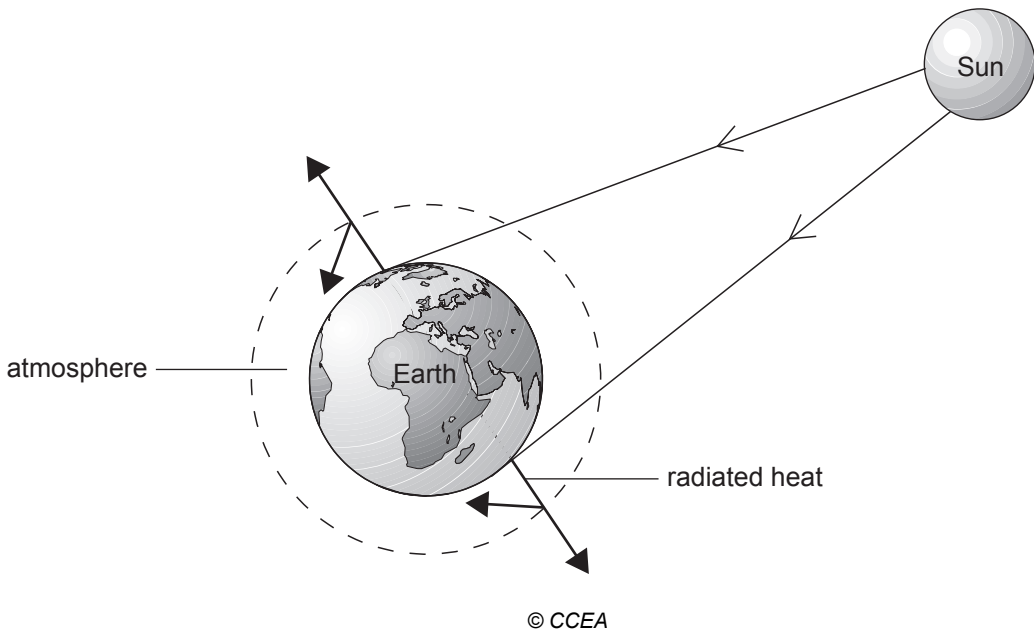
_____ [2]

Examiner Only	
Marks	Remark

(b) The following diagram shows how global warming occurs.

Examiner Only

Marks Remark



Using the diagram and your knowledge, explain how global warming occurs.

[3]

(c) Apart from temperature, name **one** abiotic factor that can be used to monitor global warming.

[1]

8 (a) In early 2014, the Ebola virus caused an epidemic in west Africa killing up to 90% of those infected. By April, over 100 people had died from this infection. There was no vaccine for the virus and many of the people who lived there had poor health due to poor sanitation and the lack of health care available. The disease spreads through close contact with an infected person.

Medical experts were worried that the outbreak could develop into a pandemic.

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

[1]

(ii) Using the information provided, give **two** reasons why medical experts thought that a pandemic was possible later in 2014.

1. _____

2. _____

[2]

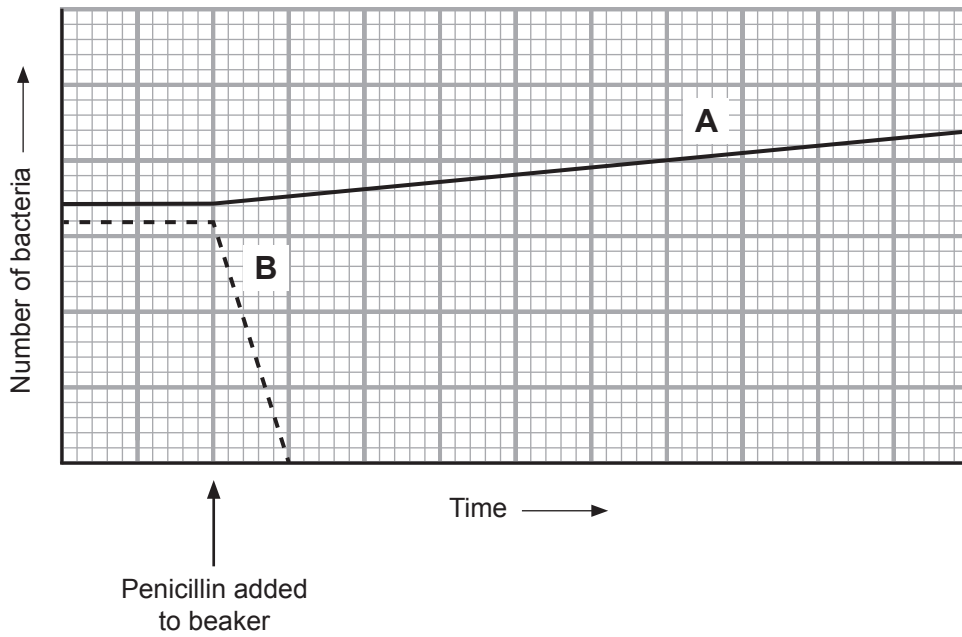
(b) Alexander Fleming is credited with accidentally discovering the first antibiotic while working with bacteria in a Petri dish.

(i) Describe his observations that led to the discovery of penicillin.

[3]

Examiner Only	
Marks	Remark

Scientists cultured (grew) two types of bacteria (**A** and **B**) in a beaker. The following graph shows how the numbers of the two types changed after penicillin was added to the beaker.



(ii) Describe and explain the changes that took place after adding penicillin.

[3]

(c) There are three stages in the development of a drug before licensing. List these stages, in order, up to the drug being licensed. [1]

_____ → _____ → _____ → licensed

Examiner Only	
Marks	Remark

9 (a) In parts of Ireland, an agreement has been made between conservationists and local councils not to cut some roadside hedgerows and their grass verges for a number of years. Conservationists are pleased to note that this is causing a rapid increase in biodiversity with the uncut hedgerows and verges producing a ‘splash of colour’ in the summer.

(i) Suggest what the ‘splash of colour’ represents.

[1]

(ii) Describe how you could carry out an investigation to compare biodiversity between uncut and cut areas.

[3]

(iii) Suggest **one** safety concern for road users if hedgerows and verges are not cut.

[1]

(b) The plants in hedgerows and verges are the producers in food chains. Describe the flow of energy through food chains.

[3]

Examiner Only	
Marks	Remark

10 (a) Modern advances in genetics can provide many benefits for humans. However, new breakthroughs in this area of science raise many concerns.

Using your understanding of **genetic screening, gene therapy** and **GM crops**, describe and explain the benefits and problems associated with each of these developments.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

[6]

(b) Advances in all areas of science are subject to peer review. State what is meant by the term 'peer review' and suggest **one** benefit it provides.

[2]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.