

(Centr	e Nu	mber
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General Certificate of Secondary Education 2017

Biology

Unit 2 Higher Tier

[GBY22]

GBY22

FRIDAY 16 JUNE, MORNING

TIME

1 hour 45 minutes.

INSTRUCTIONS TO CANDIDATES

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

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. Do not write with a gel pen.

Answer all thirteen questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 115.

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(b) and 11(b).

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Cancer cells are produced by uncontrolled cell division.	
This results in a tumour.	
The diagram shows a malignant tumour and a blood vessel before chemotherapy treatment.	
normal cells	r
© Principal Examiner vessel	
Look at the diagram	
(a) Describe two differences between a cancer cell and a normal cell	
1	
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The diagram shows the tumour and the blood vessel after chemothe	erapy treatment.
blood flow	
wall of blood vessel	© Principal Examiner
Look at the diagrams.	
(b) Give two ways the tumour has changed after chemotherapy trea	atment.
1	
	[1]
2	
	[1]
Chemotherapy is one way of treating cancer.	
(c) Give two other ways of treating cancer.	
1.	[1]
2.	[1]
	[Turn over



The arrows show the direction of blood flow.



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Look at the diagram.

(a) Name blood vessels A, B and C.

Α	[1]
В	[1]
C	[1]

- (b) (i) **Complete** the diagram by drawing the hepatic portal vein. [1]
 - (ii) Draw an arrow to show the direction of blood flow in the hepatic portal vein.

[1]

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RIA	od groups are an	example of variation	
(a)	(i) Name this ty	pe of variation.	
	(ii) Give one otl	ner example of this type of variat	ion in humans.
(b)	The table shows population.	information about blood groups Number of people in Northern Ireland	in the Northern Ireland Percentage of populat
	0	954 000	53
	A		34
	В	180 000	10
	AB	54 000	3
	AB © Crown Copyrigh Look at the table (i) The population Calculate the group A.	54 000 Statistics adapted from the Northern Ire t, 2010 - Contains public sector information licer on of Northern Ireland is 1 800 00 e number of people in the Northe	3 eland Blood Transfusion Service "Abo nsed under the Open Government Lic 00. rn Ireland population with

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Use the diagram to help explain how penicillin was discovered.

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- **5** Some microorganisms cause disease.
 - (a) Complete the table.

Disease	Type of microorganism	How microorganism spreads	Prevention
gonorrhoea			wear a condom
mumps	virus		
athlete's foot		contact	avoid direct contact

[5]

[1]

- (b) Food poisoning is caused by the microorganism Salmonella.
 - (i) What type of microorganism is Salmonella?
 - A person can suffer the symptoms of food poisoning 1–3 days after eating contaminated meat.

Salmonella sometimes survives cooking.

.

It can be spread on knives, cutting surfaces or by the food handler.

(ii) Use this information to suggest two ways to reduce the risk of spreading *Salmonella*.

	Ι	·····
		[1]
	2	
		[1]
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6 In an experiment the heart rates of two men were measured before, during and after exercise.







	ine		— A — B — C — D
	(a)	Identify the parts of the blood labelled A , B and C .	
		Α	[1]
		В	[1]
		c	[1]
	(b)	Give two differences, shown in the photograph, between A and C .	[1]
		2	[1]
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Part **D** is a liquid that transports different food substances around the body.

- (c) Name two other substances which are transported in this part of the blood.
 - 1._____
 - 2._____
- (d) The photograph shows a blood sample from a person suffering from a blood disorder.
 - $\begin{array}{c} Magnification \\ \times \, 500 \end{array}$



© CNRI / Science Photo Library

[2]

(i) Describe one difference between this sample and the normal blood sample.

	[1
Suggest which blood disorder this person suffers from and describe one possible treatment.	
Disorder	
Treatment	
	[2
[Turr	n
	Suggest which blood disorder this person suffers from and describe one possible treatment. Disorder Treatment [Turn]



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- 8 A pupil carried out an experiment to investigate the effect of placing cylinders of carrot in a range of concentrations of sugar solutions.

He weighed the cylinders and left them in the sugar solutions for two hours.

He then removed, dried and reweighed the cylinders.

(a) Diagram A shows a carrot cell after it had been left in a dilute sugar solution for two hours.



(i) On diagram A, draw a labelled line to show the part of the carrot cell that stops it from bursting. [1]

Diagram B shows a carrot cell after it had been left in a concentrated sugar solution for two hours.

Diagram B

Diagram A



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	[[¬]]
	[]
ii) Explain the appearance of the carro	ot cell in diagram B.
	[1]
3	[1]
2	
	[1]

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9 DNA carries the genetic code for living organisms.

Throughout the 1950s several scientists were involved in working out the structure of DNA.

(a) How did the work of Chargaff, Franklin and Wilkins lead to the discovery of the structure of DNA?

	Chargaff	
		[2]
	Franklin and Wilkins	
		[1]
ne	work of these scientists led to new scientific knowledge.	
)	Describe how scientific knowledge can be validated.	
		[2]
		[Turn ov



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(ii) Whv	y is this necessary?	
(,		
(iii) Deso	scribe how the temperature inside the fermenter is controlled	
_		
Before th to be dov	the product containing insulin can be used for medical purpo ownstreamed.	oses it need
(iv) Wha	at processes are involved in downstreaming?	

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11 (a) An X-ray was taken of the arteries on the surface of the heart of a patient suffering from heart disease.

The white areas show the blood flow through the arteries on the surface of the heart.





The diagrams show three stages of the treatment given to a patient with heart disease.

Stage 1

A fine tube is pushed into the partially blocked artery.

The tube is attached to a balloon covered with a metal cage.



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Suggest how this treatment helps reduce the risk of the patient having a heart attack.

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

_____[6]

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(b) Tuberculosis is a serious infection, which mainly infects the lungs.

(i) Describe how tuberculosis is spread and prevented.

[2]

The table shows the number of antibiotic resistant tuberculosis cases in the UK.

Year	Number of antibiotic resistant tuberculosis cases
2007	493
2008	555
2009	496
2010	873
2011	835
2012	2246
2013	2923

Tuberculosis in the UK 2014 report by Public Health Agency. Published September 2014. © Crown Copyright 2014. Contains public sector information licensed under the Open Government Licence v2.0

(ii) The number of antibiotic resistant tuberculosis cases changes from 2007–2013.

Describe the trend of this change.

_ [2]

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Year	Number of new antibiotics available for use
1990–1999	22
2000–2009	7
2010–2012	1

© CDC - Data from Centers for Disease Control and Prevention, Office of Infectious Diseases "Antibiotic Resistance Threats in the United States, 2013" threat report

Since 2012, twelve new antibiotics were in the final stage of development.

60% of these may become available for use.

(c) Use data from the tables to suggest how the change in the number of antibiotics available for use may affect the number of antibiotic resistant tuberculosis cases after 2013.

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[Turn over

_____ [4]

	entering.				
	1				
	[2				
	2				
	[2				
Read the passage.					
Viru whic	ses lack cellular organisation but contain genetic material surrounded by proteins ch act as antigens.				
The influenza virus reproduces quickly and often has mutations of the antigens. As a result, the influenza virus has many different types, known as strains.					
Each year scientists identify the strains of the influenza virus most likely to cause the illness around the world.					
Modified forms of the three most likely strains are used to produce an influenza vaccine for the next year.					
Onc prov	e injected into the patient the influenza vaccine takes about two weeks to vide immunity against those strains of the influenza virus.				
A pandemic can happen when a previously unknown strain of the influenza virus causes illness in large numbers of people around the world.					

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(b)	Suggest what is meant by a modified strain of the virus and explain why it is used in the vaccine to provide immunity.	
		[5]
(c)	How does this immunity stop the spread of the virus in the body?	
		_ [3]
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	For Examiner's use only	
	Question Number	Marks
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