CCEA GCSE DOUBLE AWARD SCIENCE

SCIENCE



EXAM QUESTION PACK

BIOLOGY UNIT B2 FOUNDATION TIER GSD41 PAPERS

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Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2016

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

GSD41

FRIDAY 10 JUNE, 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.
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 blue or black ink only. **Do not write with a gel pen.**
Answer **all thirteen** questions.

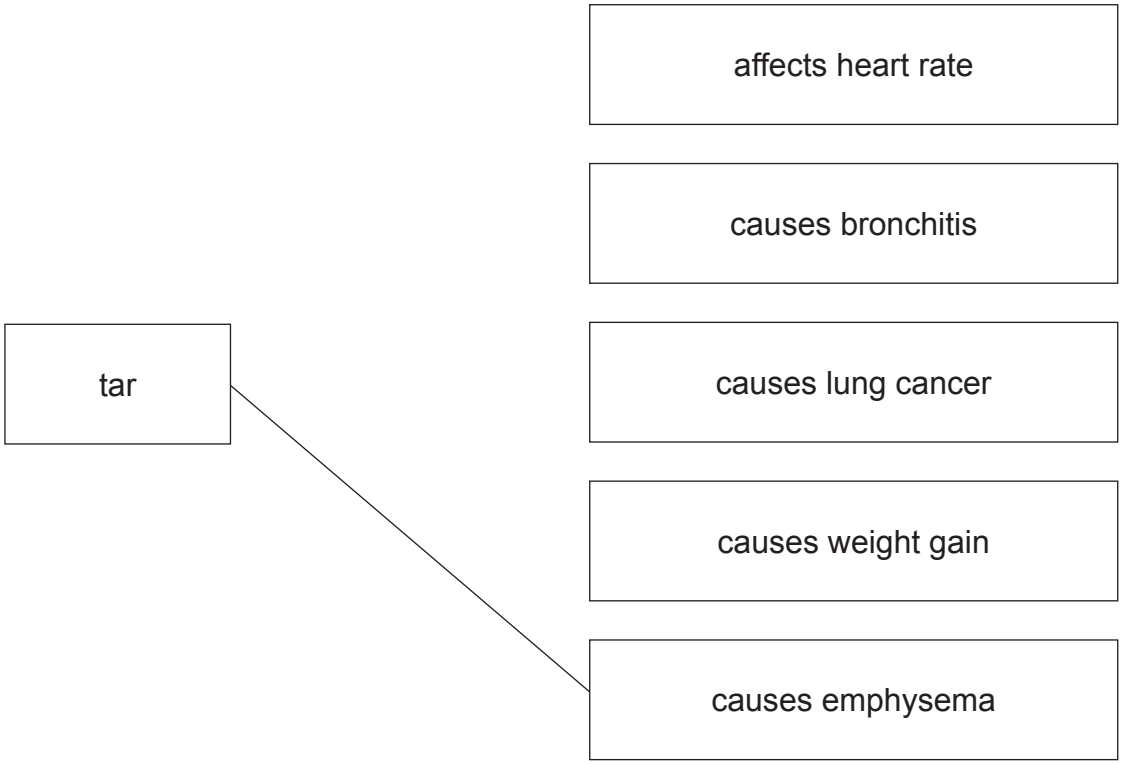
INFORMATION FOR CANDIDATES

The total mark for this paper is 90.
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 Question **11(b)**.

10145

1 **(a)** Tobacco smoke contains several substances that can cause damage to the body. Tar is one of these substances.

The diagram shows a line linking tar to one of its effects on the body.
Draw **two** more lines to link tar to its other effects on the body.



[2]

(b) **(i)** Name the substance in tobacco smoke that is addictive.

_____ [1]

(ii) Name the substance in tobacco smoke that reduces the amount of oxygen carried by the blood.

_____ [1]

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2 **(a)** Complete the definition for transpiration by writing in the spaces below.

Transpiration is the _____ of water from leaf cells

followed by diffusion through the _____ (pores). [2]

(b) **(i)** Several factors affect the rate of transpiration from leaves.

Complete the table to state how a change in each factor affects the rate of transpiration.

Choose your answer from the list for each factor.

- **increases**
- **decreases**
- **stays the same**

Factor	How it affects the rate of transpiration
Higher wind speed	
Higher temperature	
Larger surface area	
Higher humidity	

[4]

(ii) Name the apparatus used to measure the rate of transpiration from the leaves of a plant.

_____ [1]

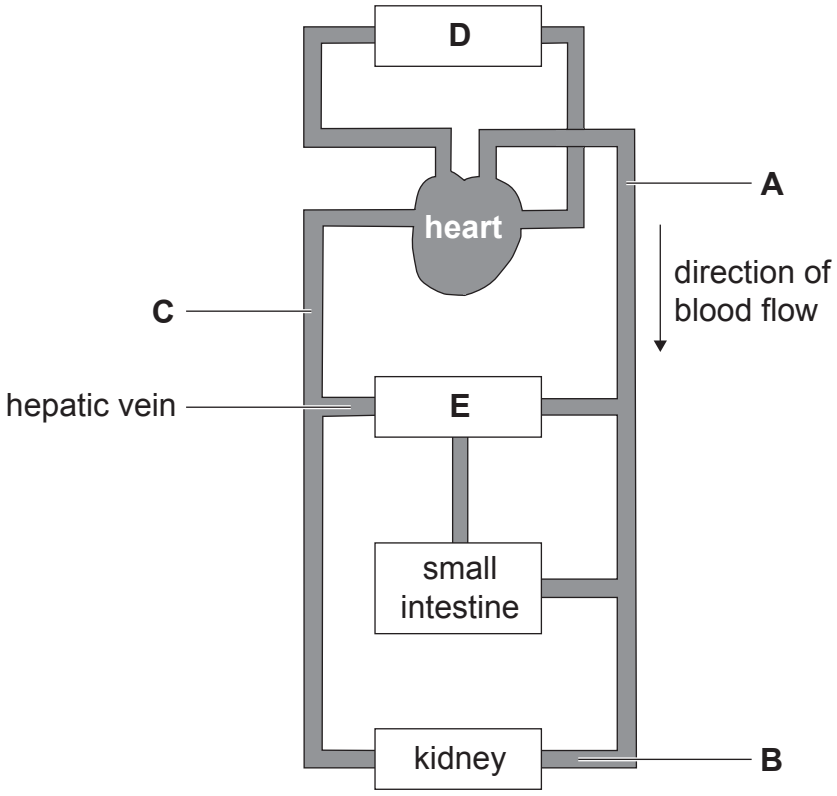
(c) Give **one** use of water in plants, other than in transpiration.

_____ [1]

[Turn over

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3 The diagram shows part of the circulatory system in the body.



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

A _____

B _____

C _____ [3]

(ii) Draw an arrow on the diagram to show the direction of blood flow in blood vessel **C**. [1]

(iii) Name organs **D** and **E**.

D _____

E _____ [2]

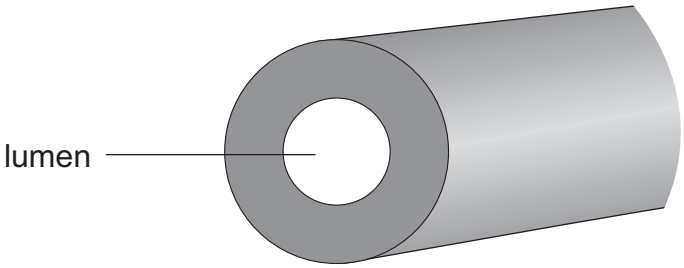
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24GSD4104

(iv) Name the upper and lower chambers of the heart.

Upper chambers _____

Lower chambers _____ [2]

(b) The diagram shows a cross section of a blood vessel.
The centre of the blood vessel, that blood flows through, is called the lumen.



© Chief Examiner

The table gives information about the three types of blood vessels.

Blood vessel	Diameter of lumen/ cm	Rate of blood flow/ cm/s
Vein	0.6	3
Capillary	0.000008	less than 0.1
Artery	0.4	25

(i) Describe how the rate of blood flow in the vein and capillary changes with the diameter of the lumen.

_____

_____ [1]

(ii) Name the **type** of blood vessel that allows exchange of materials between the blood and body tissues.

_____ [1]

[Turn over

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(iii) Name the **type** of blood vessel that carries blood under the highest pressure.

_____ [1]

(iv) Name the structures found in veins that prevent the backflow of blood.

_____ [1]

(c) If fatty deposits build up in a blood vessel going to the brain it can cause a stroke.
Describe how this build-up of fatty deposits can cause a stroke.

_____

_____

_____

_____

_____

_____

_____

_____

_____ [4]

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4 Two boys, James and Luke, exercised for ten minutes.
The table shows data for the two boys taken before and immediately after exercise.
Recovery time is the time taken for the pulse rate to return to the same rate as before exercise.

	James		**Luke**	
	Before exercise	After exercise	Before exercise	After exercise
Pulse rate/beats per minute	70	160	60	150
Recovery time/minutes		12		7

(a) Luke is fitter than James.
Use the information in the table to describe **three differences** that support this statement.

_____

_____

_____

_____

_____

_____

_____

_____ [3]

(b) Give **two** ways the heart benefits from regular exercise.

1. _____

2. _____ [2]

[Turn over

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5 Aseptic techniques are used when carrying out experiments with bacteria.
The photograph shows a loop being used to inoculate an agar plate.



© Arno Massee / Science Photo Library

(a) Explain why the loop would be put into a Bunsen burner flame at the start of the experiment.

_____ [1]

(b) During inoculation the lid of the agar plate was completely removed.
Suggest what could happen as a result of this poor aseptic technique.

_____

_____

_____ [2]

(c) After inoculation the agar plate was sealed and then incubated at less than 25 °C.
Suggest a reason for each of these two steps.

1. Sealed _____

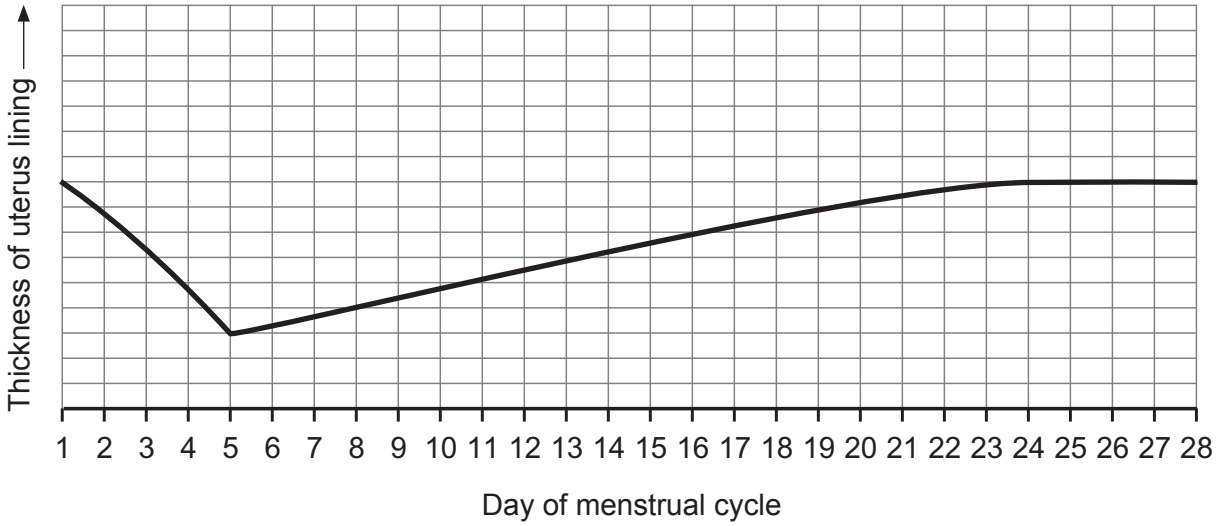
_____

2. Incubated at **less than 25 °C.** _____

_____ [2]

10145

6 The graph shows how the thickness of the uterus lining varies during a woman's menstrual cycle of 28 days.
The woman is not pregnant.



Source: Principal Examiner

(a) Use the graph to give the days when menstruation is occurring.

_____ to _____ [1]

(b) Name and describe the event that takes place on day 14 of this menstrual cycle.

Name _____

Description _____

_____

_____ [2]

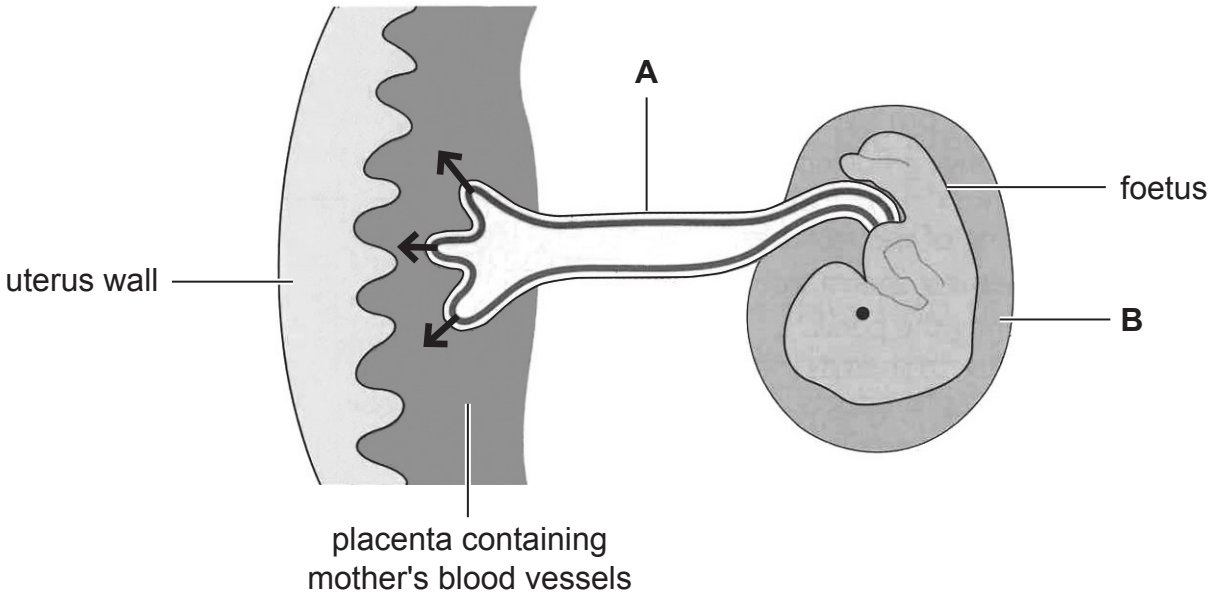
(c) Suggest what you would expect to happen to the uterus lining after day 28 if the woman became pregnant.

_____ [1]

[Turn over

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7 The diagram shows a foetus and structures that form in the uterus during pregnancy.



© GCSE Biology for CCEA, 2nd Edition by James Napier. (ISBN: 9780340983805)
"Reproduced by permission of Hodder Education".

(a) Name structure **A** that links the placenta to the foetus.

_____ [1]

(b) **(i)** Give the function of the placenta and describe how it is adapted for its function.

Function _____

_____

Adaptation _____

_____ [2]

(ii) Name **one** substance that passes in the direction shown by the arrows on the diagram.

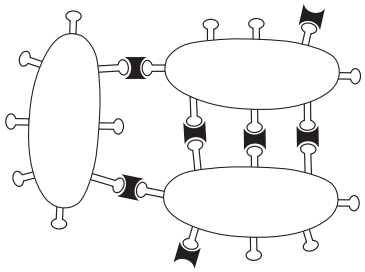
_____ [1]

(c) Name structure **B** shown on the diagram.

_____ [1]

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8 **(a)** The body has a number of defence mechanisms against disease-causing microorganisms. One of these mechanisms is the clumping of microorganisms. The diagram shows a clump of three microorganisms.



Source: Principal Examiner

(i) On the diagram, label an antigen. [1]

(ii) Describe the stages that have occurred to produce this clump.

_____

_____

_____

_____

_____

_____ [3]

(iii) Microorganisms in a clump cannot easily move.
Suggest how this helps in the defence against disease.

_____ [1]

(b) After the clump has been formed it is then destroyed by another process.
Name and describe this process.

Name _____

Description _____

_____

_____

_____ [3]

[Turn over

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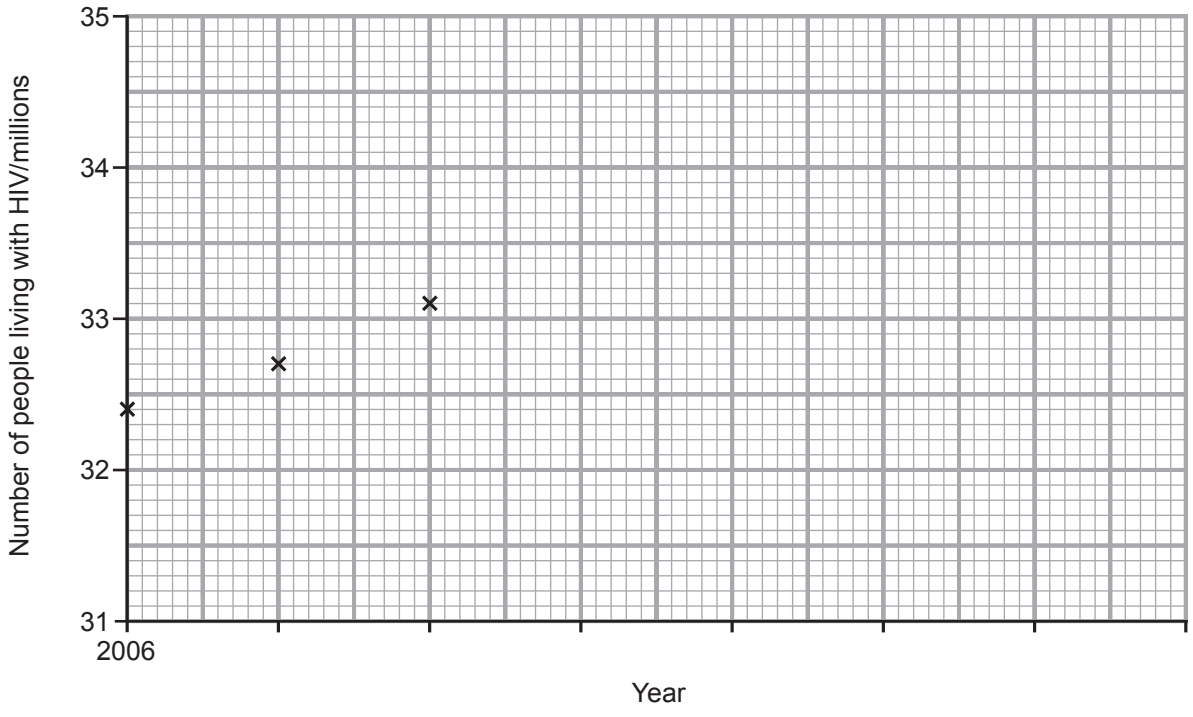
9 AIDS is a disease caused by the human immunodeficiency virus (HIV).
Table 1 shows worldwide data for HIV and AIDS for the years 2006 to 2013.

Table 1

	Number of people worldwide/millions							
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
People living with HIV	32.4	32.7	33.1	33.4	33.8	34.2	34.6	35.0
New HIV infections	2.8	2.7	2.6	2.5	2.5	2.4	2.2	2.1
AIDS related deaths	2.2	2.2	2.1	2.1	2.1	2.1	2.0	1.9
People receiving treatment				5.2	7.4	9.0	10.6	12.9

© UNAIDS, Global Report 2013, Fact Sheet

(a) (i) Use the data in **Table 1** to complete the line graph to show the number of **people living with HIV** for the years 2006 to 2013.
The first three points have been plotted for you.
Add the scale to the *x*-axis.



[4]

(ii) Describe the trend shown in the graph.

_____

_____ [1]

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Table 2 shows the amount of money spent on HIV and AIDS treatment and education for the same years.

Table 2	Year							
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Money spent/ billions of dollars	8.8	10.5	14.6	15.5	15.6	17.1	18.9	19.1

© UNAIDS, Global Report 2013, Fact Sheet

(b) The number of **AIDS related deaths** decreased from 2006 to 2013.

(i) Use the data in **Table 1 opposite**, to calculate the percentage decrease in **AIDS related deaths** from 2006 to 2013.

Show your working.

_____ % [2]

(ii) Use the data in the tables to give **two** reasons to explain this decrease in AIDS related deaths over this period.

1. _____

_____

2. _____

_____ [2]

(c) **(i)** Some other diseases caused by viruses can be prevented using vaccinations.
Name the scientist who developed the first vaccination.

_____ [1]

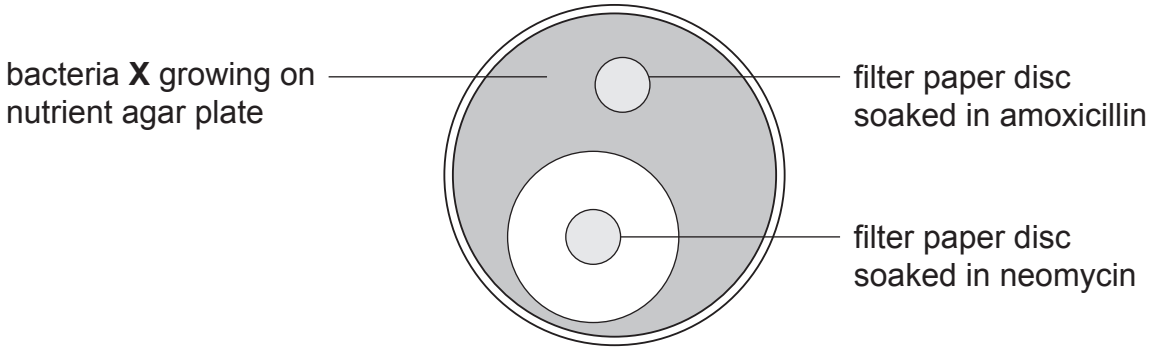
(ii) What disease was this vaccination used against?

_____ [1]

[Turn over

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10 Antibiotics are chemicals that are used to kill bacteria.
A nutrient agar plate had one type of bacteria (**X**) growing on the surface.
Two discs of filter paper, each soaked with a different antibiotic, were placed on the surface of the nutrient agar plate.
One disc of filter paper was soaked in amoxicillin and the other was soaked in neomycin.
The diagram shows the nutrient agar plate after it had been incubated for two days.



Use the diagram and your knowledge to describe and explain the effects of the antibiotics amoxicillin and neomycin on the growth of bacteria **X**.

Description _____

_____

_____

_____

Explanation _____

_____

_____

_____

_____

_____

_____ [4]

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(Questions continue overleaf)

11 Infertility in women can have several causes.

(a) Give **two** causes of infertility in women.

1. _____

_____

2. _____

_____ [2]

(b) In vitro fertilisation (IVF) can be used to treat infertility in some women. Describe the stages in the process of IVF.

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

_____

_____

_____

_____

_____

_____

_____

_____

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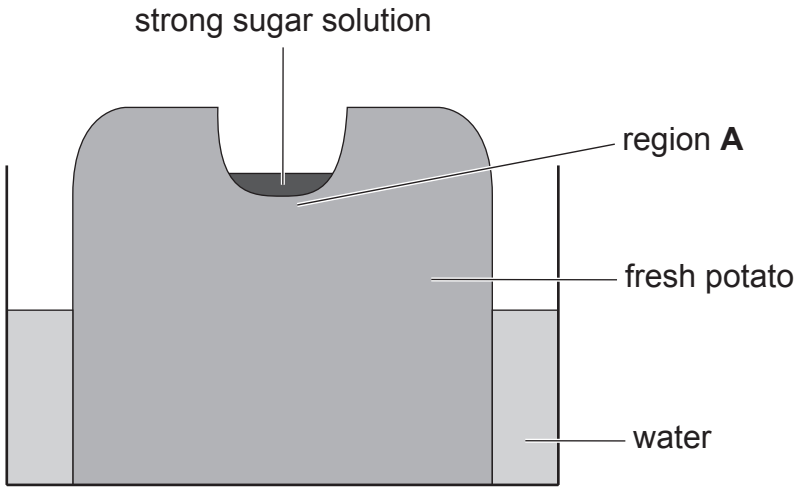
_____

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[6]

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24GSD4117

12 Megan and Paul set up an experiment to investigate osmosis in a potato.
The diagram shows the levels of strong sugar solution and water at the start of the experiment.



The experiment was left for 4 hours.

(a) Describe what happened to the level of the strong solution after 4 hours.
Explain your answer.

Description _____

_____

Explanation _____

_____

_____

_____

_____ [3]

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24GSD4118

(b) Describe how the vacuole and the cell membrane from a cell in region **A** will have changed after 4 hours, when the cell has become plasmolysed.

Vacuole _____

Cell membrane _____ [2]

[Turn over

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13 Peony plants have plain red or red striped flowers.
The photograph shows a red striped peony flower.



© Ian Gowland / Science Photo Library

In peony flowers the allele **R** for plain red colour is dominant.
The allele **r** for red striped flowers is recessive.

(a) A peony plant, homozygous for plain red flowers, is crossed with a heterozygous peony plant.
Draw a Punnett square to show the genotypes of the flowers that would be produced from this cross.

[4]

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(b) Seeds were collected from another peony plant.
When plants were grown from these seeds the types of flowers produced were counted.
The bar graph shows the results.



(i) Use the graph to give the ratio of plain red flowers to red striped flowers produced from these seeds.

_____ to _____ [1]

(ii) Use the graph to give the type of variation shown by these flowers.

_____ [1]

(iii) Name a human characteristic that shows this type of variation.

_____ [1]

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
Total Marks	

Examiner Number

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Rewarding Learning

General Certificate of Secondary Education
2016

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

FRIDAY 10 JUNE, MORNING

MARK SCHEME

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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

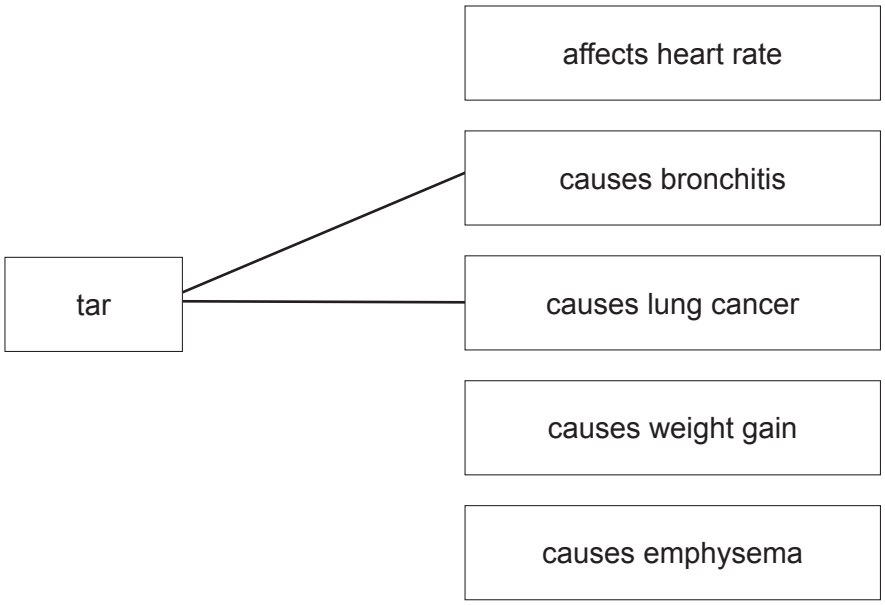
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The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark 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)**		[2]	
	(b) **(i)**	nicotine	[1]	
	(ii)	carbon monoxide/CO	[1]	4
2	**(a)**	evaporation; stomata/stoma	[2]	
	(b) **(i)**	increases/quicker; increases/quicker; increases/quicker; decreases/slower;	[4]	
	(ii)	potometer bubble potometer/weight potometer	[1]	
	(c)	photosynthesis/support/turgor/transport	[1]	8

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					AVAILABLE MARKS
3	(a)	(i)	A = aorta B = **renal artery** (need both) C = vena cava (need both)	[3]	
		(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]	16
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
5	(a)		sterilise/kill bacteria/disinfect/destroy micro-organisms	[1]	
	(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]	5

				AVAILABLE MARKS
6	(a)	1–5	[1]	
	(b)	ovulation; egg released **from the ovary**;	[2]	
	(c)	remains thick/doesn't come away/doesn't break down	[1]	4
7	(a)	**umbilical cord**	[1]	
	(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]	5
8	(a) (i)	any antigen labelled	[1]	
	(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]	8
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

	AVAILABLE MARKS

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] — 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]

8

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			AVAILABLE MARKS
12	**(a)**	**Description**: level raised; **Direction:** water moves; from dilute to a more concentrated solution; through a selectively permeable membrane; [3]	
	(b)	**vacuole** has shrunk; cell membrane pulled away from the cell wall [2]	5
13	**(a)**	Punnett; RR for parent; parent Rr; correct offspring; [4]	
	(b)	**(i)** 3:1 [1]	
		(ii) discontinuous [1]	
		(iii) blood groups/tongue rolling/attached ear lobes/eye colour/gender [1]	7
		Total	**90**

	R	R
R	RR	RR
r	Rr	Rr

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Rewarding Learning

General Certificate of Secondary Education
2015

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

FRIDAY 5 JUNE, AFTERNOON

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				AVAILABLE MARKS
1	(a)	blood; brain;	[2]	
	(b)	**More** successful treatment/**less** damage/**more** likely to survive	[1]	3
2	(a)	(i) Joining of an egg **nucleus** and a sperm nucleus;	[1]	
		(ii) A in oviduct;	[1]	
		(iii) Cell divides/mitosis/forms a ball/cells	[1]	
		(iv) In lining of uterus	[1]	
	(b)	(i) To cushion the baby/protect baby/support baby	[1]	
		(ii) Large surface area/short diffusion distance/good blood supply/thin walls/villi;	[1]	
		(iii) Oxygen; glucose;	[2]	
	(c)	Abstain/contraception/named method/pill/male or female sterilisation	[1]	9
3	(a)	Number of sunflowers y-axis [1]; Suitable scale [1] (at least half the grid); etc. [1] for correct plotting; [1] for bars (can do bars or histogram)	[4]	
	(b)	Continuous;	[1]	5
4	(a)	It is addictive	[1]	
	(b)	No tar/no carbon monoxide	[1]	
	(c)	70 cigarettes = [1] 7 packs = [1] 40 × 5 = [1] £28 = [2]	[2]	
	(d)	(i) **Bronchi/bronchioles** narrow/inflamed	[1]	
		(ii) Abnormal cell division uncontrolled cell division	[1]	6
5	(a)	(matching correct shapes or letters) A – T; C – G; Backbone correct;	[3]	
	(b)	sugar/deoxyribose; phosphate;	[2]	
	(c)	Double helix	[1]	
	(d)	Nucleus	[1]	7

AVAILABLE MARKS

6 **(a)** **(i)** Two XX chromosomes/No Y chromosomes [1]

(ii) Three chromosomes at number 21/47 chromosomes/an extra chromosome [1]

(b) **(i)** As the age of the mother **increases** the chance of having a child with Down Syndrome **increases** [1]

(ii) 1 in 200 and 1 in 1000; $\frac{1000}{200}$ = **5** = [2] [2]

(iii)
- Parents should not be able to **select** something, e.g. sex of baby;
- Increased risk of **miscarriage**
- May opt for termination/**abortion** [2]

(c) **(i)**

	X	Y
X	XX	XY
X	XX	XY

Punnett square;

Correct gametes for each parent = [2];
Correct cross (even if wrong gametes); [4]

(ii) 1 : 1 or 2 : 2 [1]

12

7

	Patient/s who is/are	Evidence	
Male	A;	Testosterone	;
Most likely to be a smoker	B;	CO/carbon monoxide	;
Most likely to be receiving IVF treatment	C;	Fertility hormones	;
Most likely to be a binge drinker	A;	**High** blood alcohol level	;

8

AVAILABLE MARKS

8 **Indicative content:**

Any six from:

- soak **a** disc in an antibiotic or both discs
- set discs on agar
- incubate/leave for 24 hrs or more
- at 25°C/less than 25°C/about 25°C
- seal/use sellotape/do not reopen
- autoclave/sterilise after/safe disposal/wipe benches (before or after)
- **A** has a bigger clear area
- **A** kills more bacteria/prevents more growth

Response	Mark
Candidates give 5 or 6 points from the indicative content to describe how to set up the Petri dishes and interpret the results and give safety precautions for the investigation. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates give 3 or 4 points from the indicative content to describe how to set up the agar plates or interpret the results or give safety precautions for the investigation.	[3]–[4]
Candidates give 1 or 2 points from the indicative content to describe how to set up the agar plates or interpret the results or give safety precautions for the investigation.	[1]–[2]
Response not worthy of credit.	[0]

[6] 6

9 **(a)** **(i)** 8%; [1]

(ii) No net movement of water/water is neither moving into or out of the potato
concentrations inside and outside are equal/isotonic [1]

(b) **(i)** Turgid cell drawn – looks more turgid than in **(ii)**; [1]

(ii) Correct label for cell wall **must** be a double line
Correct label for cell membrane [1]
Plasmolysed cell drawn (cell membrane pulled away from wall at all or some parts) [1] [3]

(c) Cell wall = limits the entry of water/stops cell from bursting/stops lysis [1] 7

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			AVAILABLE MARKS
10	**(a)**	Any **four** from: • Fat/fatty deposits/cholesterol in the blood vessel/coronary arteries/clot • Clot/blockage/reduces or stops the blood flow (to heart muscle) • Less oxygen/glucose reaches the heart muscle • No/less respiration • Muscle cells die/heart stops **beating**/heart stops **contracting** [4]	
	(b) **(i)**	Any **three** from four: **Reduction statement** – cholesterol reduced with statins **or** reduced without statins/with diet • Statins reduce cholesterol from 6 to **3.8 units**/by 2.2 units; • Without statins cholesterol levels are reduced from 6 to **5.5**/ reduced by 0.5; **Comparison mark** • Statins reduce cholesterol levels **more** than without statins • statins reduce it **faster**/or difference from 5.5–3.8 or diff of 1.7 [3] Maximum [2] for data (after 6 months)	
	(ii)	To **compare** this group with those that took statins/as a **control**/to see if statins make the level drop **faster**/to see if diet alone can bring down cholesterol [1]	
	(iii)	12000 men; = 2000 women [2] Correct answer [2]	
	(iv)	Any **two** from: • Reduce salt intake/less salt • Exercise/more sport (described) • Reduce stress • Don’t smoke/give up smoking • Don’t binge drink/don't drink/drink less [2]	12
11	**(a)**	Any **three** from: • Remove the **gene for insulin** • Remove the plasmid (from the bacterium) • Cut the plasmid open/split plasmid open • Insert insulin gene (into plasmid/bacterial DNA) [3]	
	(b)	The bacteria reproduce/clone themselves/bacteria put into a fermenter/ bioreactor [1]	
	(c)	Any **two** from: • Human insulin has no side effects/no allergic reactions/no rejection • Don’t have to kill/harm any animals/no ethical issues [2]	
	(d)	Diabetes [1]	7

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					AVAILABLE MARKS
12	**(a)**		Stomata	[1]	
	(b)	**(i)**	Potometer	[1]	
		(ii)	Use the syringe	[1]	
	(c)	**(i)**	Air bubble drawn in correctly (right hand side of the bubble must start at 6)	[1]	
		(ii)	8 mm	[1]	
	(d)		8	[1]	
	(e)	**(i)**	Fan on/wind	[1]	
		(ii)	Bubble moves less/decreases/bubble doesn't move at all	[1]	8
				Total	**90**

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2014

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

GSD41

FRIDAY 6 JUNE 2014, 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 **90**.
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 **question 8(b)**.

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

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Examiner Only	
Marks	Remark

1 Diseases can be caused by three types of microorganism; bacteria, fungi and viruses.

(a) Look at the lists below.

Draw lines to link each type of microorganism to the disease that it causes.

Type of microorganism	Disease
Bacteria	Athlete's foot
Virus	Mumps
Fungus	Salmonella

[2]

(b) Which one of the diseases, in the list above, could be caused by eating undercooked chicken?

_____ [1]

(c) Name the type of microorganism, in the list above, that can be treated by an antibiotic such as penicillin.

_____ [1]

(d) Suggest how the spread of athlete's foot can be prevented.

_____ [1]

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Examiner Only	
Marks	Remark

2 Tobacco smoke contains substances that cause harmful effects on the body.

(a) Name three of these substances.

1. _____

2. _____

3. _____ [3]

(b) Choose one of these substances and give **two** harmful effects it has on the body.

Substance _____

Harmful effects on the body _____

_____

_____

_____ [2]

Cannabis is an illegal drug.

(c) Suggest **one** harmful effect on the individual and **one** harmful effect on society of using cannabis.

Individual _____

Society _____ [2]

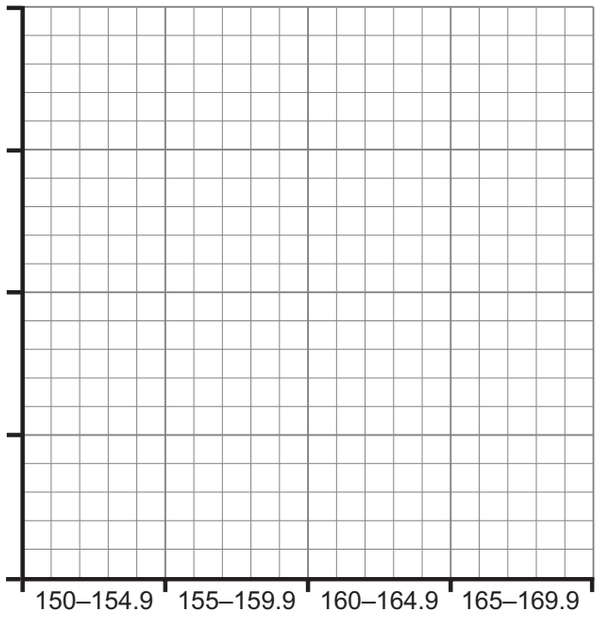
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Examiner Only	
Marks	Remark

3 **(a)** Twenty girls had their height measured on their sixteenth birthday. The number of girls in each height range is given in the table below.

Height range /cm	Number of girls
150–154.9	2
155–159.9	6
160–164.9	8
165–169.9	4

(i) On the grid below, plot a histogram using the data in the table. Add a label and a scale to the y-axis.



[4]

(ii) Which height range is the most common for these girls?

_____ cm [1]

(iii) The difference in height is an example of variation.
Give the two factors that cause variation in height.

1. _____

2. _____ [2]

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(b) The same twenty girls were tested to see if they could roll their tongues.

The photograph shows a girl who can roll her tongue.



© Herve Conge, ISM / Science Photo Library

60% of the girls were able to roll their tongues.

(i) What **percentage** of the girls were **not** able to roll their tongues?

_____% [1]

(ii) How **many** of the twenty girls were **not** able to roll their tongues?

Show your working.

_____ [2]

(c) What type of variation is shown by the girls being able or not able to roll their tongues?

Underline the correct answer from the list below.

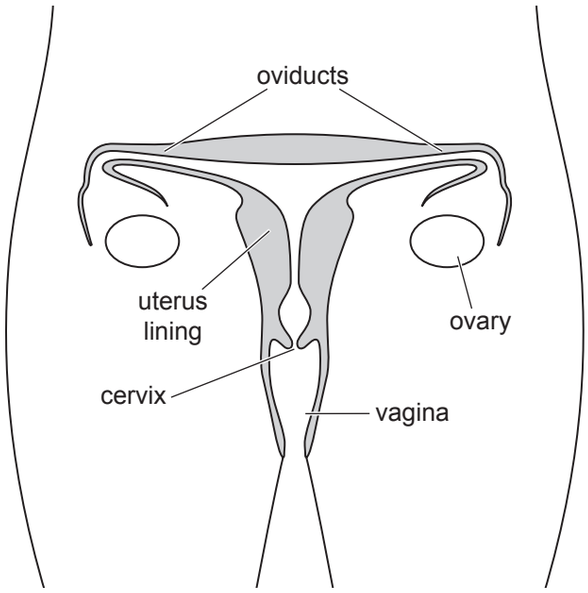
continuous **normal** **discontinuous** [1]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

4 **(a)** The diagram below shows part of the female reproductive system.



© Focus Educational Software Ltd

(i) On the diagram, draw an X to show where a sperm nucleus fuses with an egg nucleus. [1]

(ii) Name the process that occurs when a sperm nucleus fuses with an egg nucleus.

_____ [1]

After a sperm nucleus fuses with an egg nucleus, a zygote is formed. This divides to form a ball of cells.

(iii) Name the type of cell division which occurs to form a ball of cells.

_____ [1]

Development of a ball of cells is followed by implantation.

(iv) Name the structure, labelled on the diagram, where implantation occurs.

_____ [1]

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After implantation, the placenta develops. The placenta allows substances to pass across from the mother to the foetus and from the foetus to the mother.

(v) Name two substances, needed by the foetus, that pass across the placenta **from the mother** to the foetus.

1. _____

2. _____ [2]

Harmful substances like alcohol can also pass across the placenta from the mother to the foetus.

(vi) Suggest **one** harmful effect of alcohol on the development of the foetus.

_____ [1]

(vii) Suggest **one** way that the government could encourage pregnant women not to drink alcohol.

_____ [1]

(b) A sex hormone in females causes secondary sexual characteristics to develop.

Complete the table by naming this hormone, naming the organ where it is produced and describing two secondary sexual characteristics that it causes to develop.

Name of female sex hormone	Organ where produced	Secondary sexual characteristics developed
		1.
		2.

[4]

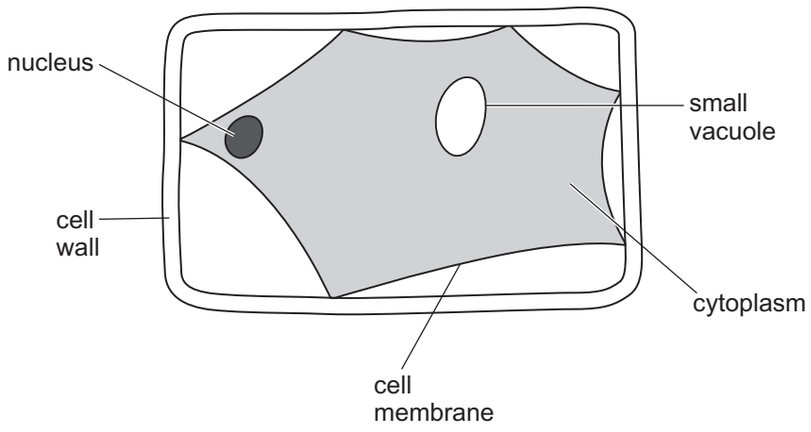
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

5 The diagram below shows a plant cell as seen under a microscope.
The cell had been left in strong sugar solution for 30 minutes.



© CCEA

(a) What term describes the cell as it appears in the diagram?

_____ [1]

(b) Redraw the cell, **to the same scale**, as it would appear after being left in water for 30 minutes.
Label the **cell wall**, **cell membrane** and **vacuole** on your drawing.

[4]

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(Questions continue overleaf)

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Examiner Only	
Marks	Remark

6 **(a)** Immunity to disease is produced by raised antibody levels in the blood.

The four types of immunity are listed below.

- **Natural innate**
- **Natural acquired**
- **Artificial active**
- **Artificial passive.**

(i) Which type of immunity, in the list above, best describes catching a disease and then recovering from the disease?

_____ [1]

(ii) Which type of immunity, in the list above, best describes a person receiving ready-made antibodies against a disease such as tetanus?

_____ [1]

(b) The photograph below shows the type of mosquito which can carry the virus that causes the disease yellow fever. When a person is bitten by this type of mosquito, the virus can be passed to that person. Approximately 7% of people who catch yellow fever die from it within three weeks.



© Sinclair Stammars/ Science Photo Library

Paul is planning to visit Africa and has been advised to be vaccinated against yellow fever before he travels.

Suggest two reasons why Paul should be vaccinated before he travels.

1. _____

2. _____ [2]

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(c) The MMR vaccine gives immunity against measles, mumps and rubella.

The table below shows the percentage of the population who received the MMR vaccine in 2011, in the different regions of the United Kingdom.

Region of United Kingdom	Percentage of the population who received the MMR vaccine
England	89.1
Wales	91.5
Scotland	93.2
Northern Ireland	92.9

(i) Calculate the difference in the percentage of the population who received the MMR vaccine in Northern Ireland compared to England.

_____ % [1]

In 2011, there were fewer cases of measles in Northern Ireland than in England.

(ii) Suggest **one** reason why there were fewer cases of measles in Northern Ireland than in England, in 2011.

_____

_____ [1]

(iii) Name the scientist who developed the first vaccine.

_____ [1]

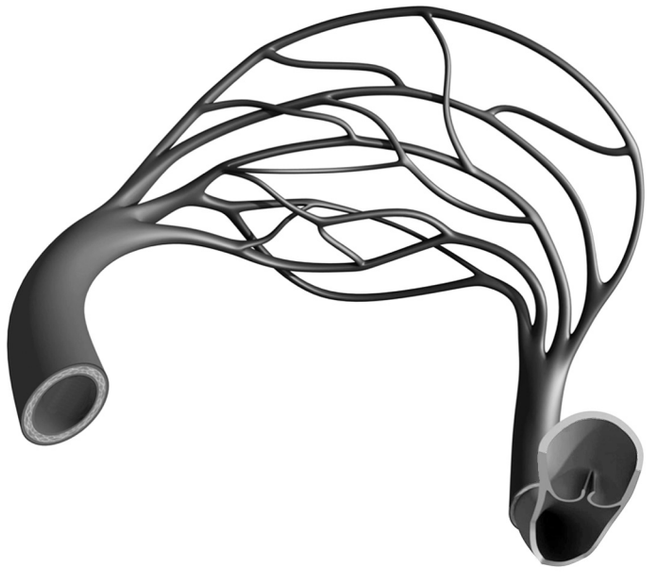
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

7 **(a)** The diagram below shows an artery and a vein connected by capillaries. Veins have valves. Arteries and capillaries do not have valves.



direction of blood flow

© 3D4Medical.com/ Science Photo Library

(i) Using the information given and your knowledge, label the vein on the diagram. [1]

(ii) What is the function of valves in a vein?

_____

_____ [1]

(iii) Give two differences between blood flowing in an artery and a vein.

1. _____

2. _____ [2]

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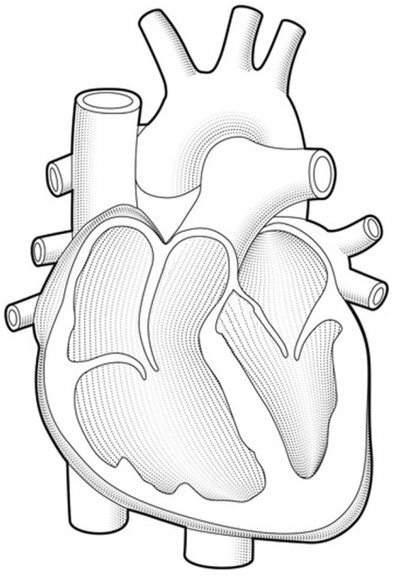
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(Question 7 continues overleaf)

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(b) The heart pumps blood around the body.

The diagram below shows a section through the heart.



© Paul Wootton/ Science Photo Library

(i) On the diagram, label the left ventricle and the pulmonary artery. [2]

Blood passes through the heart twice during one complete circuit of the body.

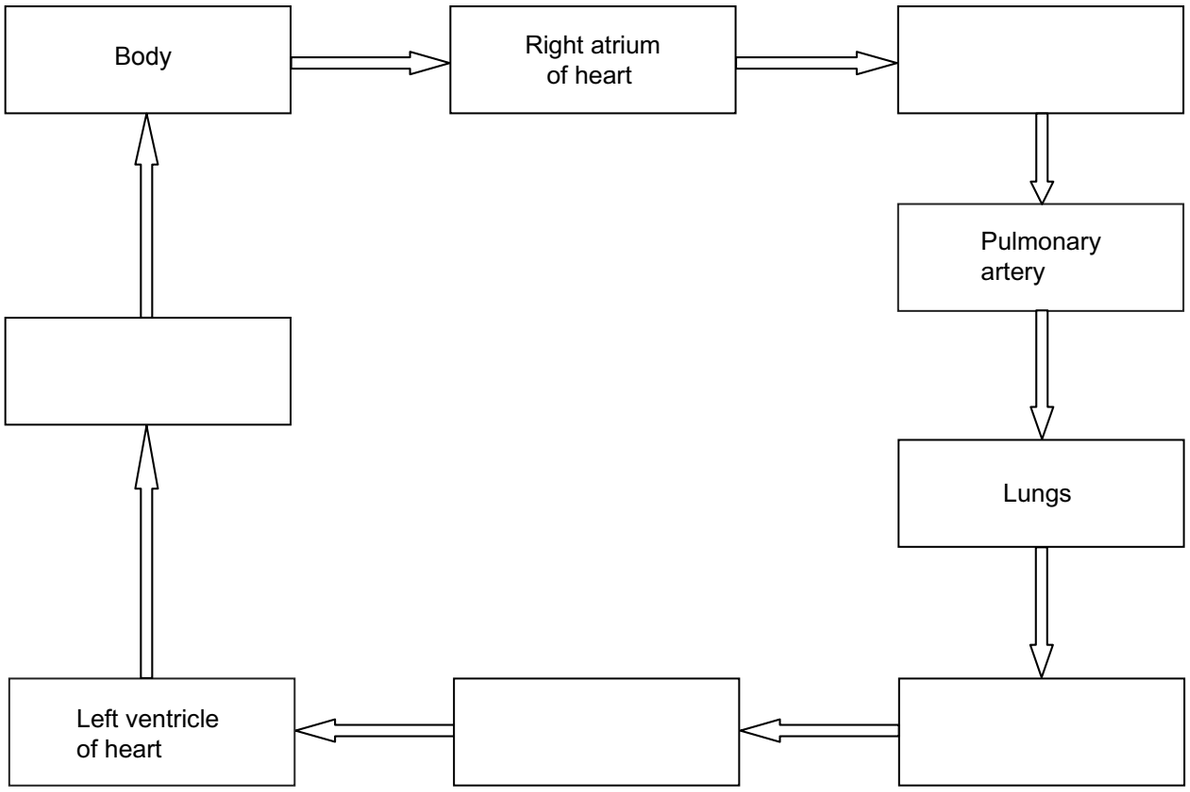
(ii) What term is used to describe the passage of blood twice through the heart during one complete circuit of the body?

_____ [1]

Examiner Only	
Marks	Remark

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(iii) In the diagram below, fill in the empty boxes to show the passage of blood through the heart and around the body.
The empty boxes represent heart chambers or blood vessels.



[4]

(iv) Name the blood vessel which brings oxygenated blood to the liver.

_____ [1]

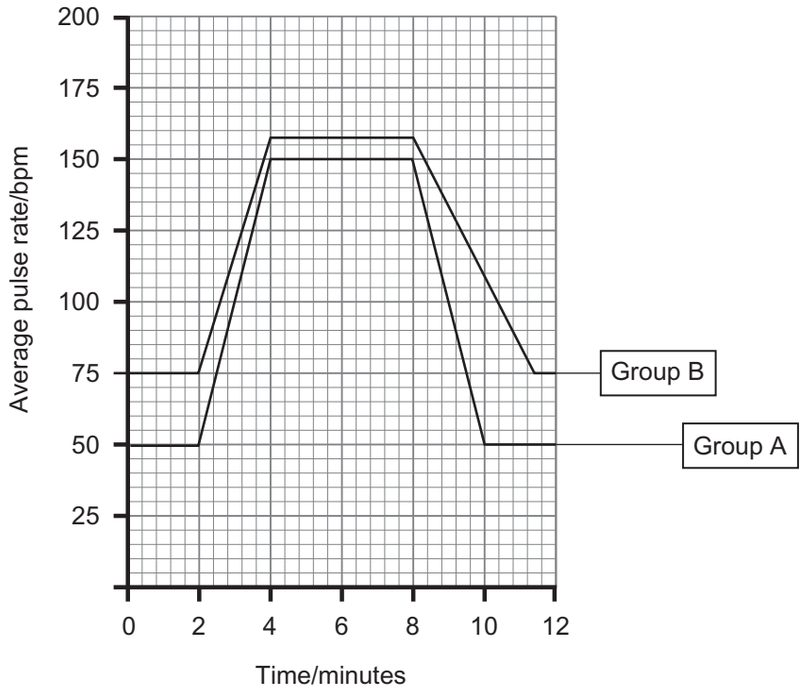
Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

8 **(a)** The graph below shows the average pulse (heart) rates of two groups of students before, during and after exercise.

The pulse rates are measured in beats per minute (bpm).



© CCEA

(i) Using the graph, give the time when the exercise started.

_____ min [1]

(ii) Using the graph, give three differences in the average pulse rates between Group A and Group B.

1. _____

2. _____

3. _____ [3]

(iii) Students in Group A take regular exercise.
Give two ways that the **circulatory system** benefits from regular exercise.

1. _____

2. _____ [2]

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(b) To maintain a healthy heart, a person needs a balanced diet which is low in cholesterol.

Describe and explain how a diet which is high in cholesterol could lead to a heart attack.

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

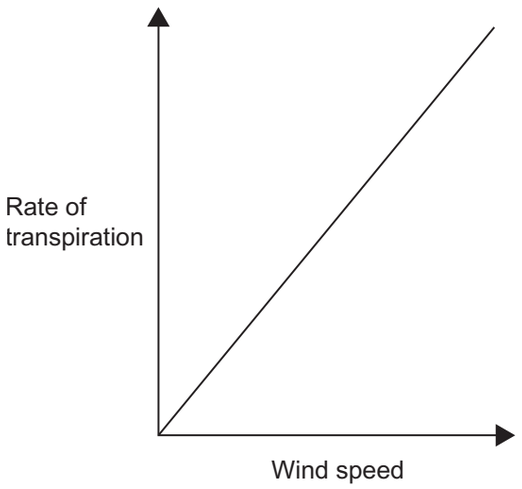
[6]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

9 **(a)** The graph below shows the effect of increasing wind speed on the rate of transpiration in plants.



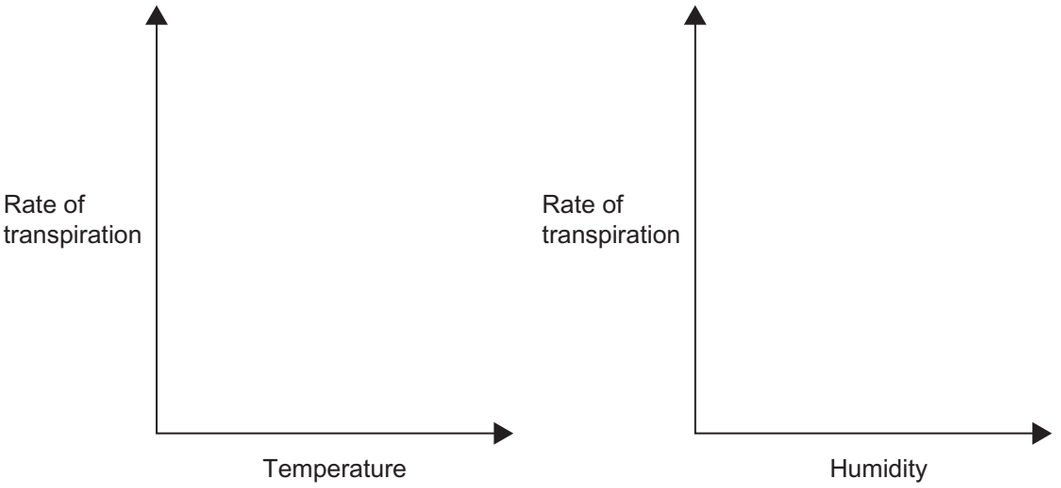
(i) Using the graph, describe the trend shown.

_____

_____ [1]

Temperature and humidity are two other factors that have an effect on the rate of transpiration in plants.

(ii) On the axes below, draw a line to show the effect of increasing temperature and a line to show the effect of increasing humidity on the rate of transpiration.

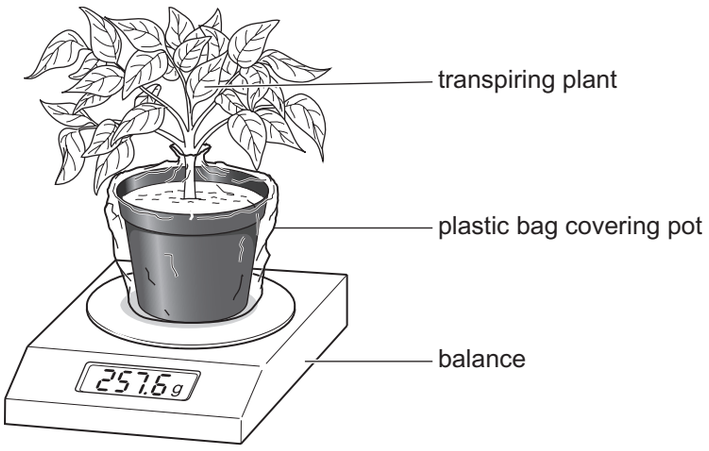


[2]

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Examiner Only	
Marks	Remark

(b) The diagram below shows apparatus used to investigate the effect of surface area of leaves on the rate of transpiration in a plant.



© CCEA

(i) Suggest why the pot was covered with a plastic bag.

_____ [1]

The plant was weighed, left for **24 hours** and then reweighed.

The **rate** of transpiration was calculated as 3.8 g per hour.

Some leaves were removed from the plant and the experiment was repeated.

The table below shows the result for the second experiment.

Mass of plant at start /g	Mass of plant after 24 hours /g
257.6	185.6

(ii) Using the data in the table above, calculate the rate of transpiration (in g per hour) in the second experiment.

Show your working.

_____ g per hour [2]

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(iii) Explain why the rate of transpiration is lower when some leaves were removed.

_____

_____ [2]

(iv) Plants use water in transpiration.

Give two **other** uses of water by a plant.

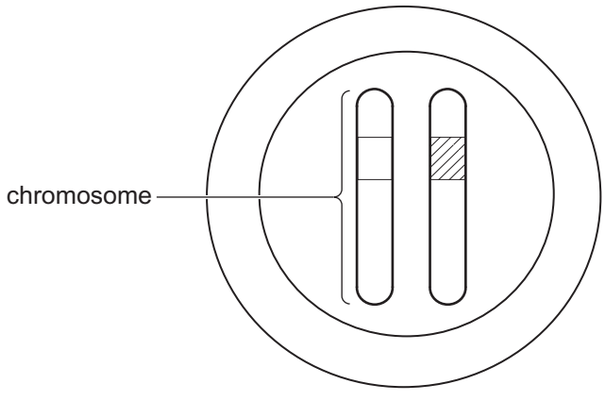
1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

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10 (a) The diagram below shows a cell containing a nucleus with two chromosomes.



© CCEA

(i) Name the molecule that makes up chromosomes.

_____ [1]

(ii) In the space below, draw the cells and chromosomes that would be produced when this cell divides by **mitosis**.

[3]

Examiner Only	
Marks	Remark

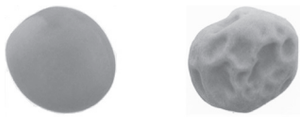
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Examiner Only	
Marks	Remark

(b) Genes control characteristics in organisms.

Peas can be smooth or wrinkled.

This characteristic is shown in the photograph below.



smooth wrinkled

© Walter Eberhart, Visuals Unlimited/ Science Photo Library

Let H represent the allele for smooth peas.

Let h represent the allele for wrinkled peas.

(i) Using a Punnett square, show the possible offspring produced when a heterozygous, smooth pea plant is crossed with a wrinkled pea plant.

[4]

(ii) Using your Punnett square, give the ratio of smooth pea plants to wrinkled pea plants.

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

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178410

Rewarding Learning

General Certificate of Secondary Education
2014

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

FRIDAY 6 JUNE 2014, AFTERNOON

MARK SCHEME

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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.

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				AVAILABLE MARKS
1	**(a)**	Bacteria – Salmonella; Virus – Mumps; Fungus – Athlete's foot All 3 correct = [2] 1 correct = [1]	[2]	
	(b)	Salmonella;	[1]	
	(c)	Bacteria;	[1]	
	(d)	Wear flip-flops/dry feet properly;	[1]	5
2	**(a)**	Tar; Nicotine; Carbon monoxide;	[3]	
	(b)	Any **two** from: Tar • lung cancer/throat cancer/mouth cancer/tongue cancer • emphysema • bronchitis **or** Nicotine • addiction • irregular/faster heart beat; affected heart rate **or** Carbon monoxide • combines with red blood cells • less oxygen carried • less respiration No marks for substance on its own Harmful effects must agree with substance	[2]	
	(c)	Individual: memory loss/addiction/mental health problems. Society: family breakup/crime/cost of treatment/time off work.	[2]	7
3	**(a)**	**(i)** Plots correct; bars Scaling of *y*-axis correct; Label of *y*-axis;	[4]	
		(ii) 160–164.9	[1]	
		(iii) Genes; Environment;	[2]	
	(b)	**(i)** 40%;	[1]	
		(ii) $\frac{40}{100} \times 20$; 8; (or 8 on own for [2])	[2]	
	(c)	Discontinuous;	[1]	11

					AVAILABLE MARKS
4	**(a)**	**(i)**	In oviduct;	[1]	
		(ii)	Fertilisation;	[1]	
		(iii)	Mitosis;	[1]	
		(iv)	Uterus (lining);	[1]	
		(v)	Any **two** from: • Oxygen • Antibodies • Glucose • Amino acids • Vitamins • Minerals • Hormones (Accept named dissolved nutrients but **not** nutrients on its own)	[2]	
		(vi)	Any **one** from: Brain damage/foetal alcohol syndrome/low birth weight/blindness/ visual problems Learning difficulties	[1]	
		(vii)	Increase price of alcohol/more education about alcohol/targeted advertising;	[1]	
	(b)	Oestrogen;	Ovaries;	Any **two** from: • Breast (development) • growth of pubic hair • (onset of) menstruation • hips widen	[4]	12
5	**(a)**	Plasmolysed;			[1]	
	(b)	Scale (same size); Membrane against cell wall <u>and labelled</u>; Cell wall <u>correctly labelled</u>; Vacuole drawn larger;			[4]	5

					AVAILABLE MARKS
6	**(a)**	**(i)**	Natural acquired;	[1]	
		(ii)	Artificial passive;	[1]	
	(b)		Any **two** from: • Antibiotics won't be effective/treatment of viral diseases difficult • Might not be able to get good medical care • Hard to avoid being bitten • To provide him with immunity/to get high levels of antibodies	[2]	
	(c)	**(i)**	3.8;	[1]	
		(ii)	Higher percentage of the population in NI were vaccinated. Bigger population in England/converse;	[1]	
		(iii)	Jenner;	[1]	7
7	**(a)**	**(i)**	Correctly labelled;	[1]	
		(ii)	To prevent backflow of blood;	[1]	
		(iii)	Any **two** from: • Higher pressure • away from heart • flows in veins/pulses in arteries • higher velocity	[2]	
	(b)	**(i)**	Correctly labelled;	[2]	
		(ii)	<u>Double circulation</u>;	[1]	
		(iii)	Clockwise order Right ventricle; Pulmonary vein; Left atrium; Aorta;	[4]	
		(iv)	Hepatic artery; (do **not** accept hepatic on own)	[1]	12

AVAILABLE MARKS

8 **(a)** **(i)** 2 minutes; [1]

(ii) Any **three** from:
- Group A lower throughout/or average pulse is lower
- Group A lower resting pulse (rate)
- Group A faster increase/rises faster
- Group A lower peak pulse (rate)
- Group A returns to normal faster
- Group A has bigger increase [3]

Allow converse if stated Group B

(iii) Any **two** from:
- Increased heart volume/more blood pumped (per beat)
- Stronger heart muscle
- Reduced risk of heart attack/stroke [2]

(b) **Indicative content**
- Cholesterol/fat laid down in walls
- Of **coronary** arteries
- Reducing blood flow
- Less glucose/oxygen available
- For respiration
- Heart/muscle/cells die
- So heart can't contract [6]

Response	Mark
Candidates must use appropriate specialist terms throughout to describe how a heart attack occurs (using at least five of the above points). They use good spelling, punctuation and grammar and form and style are of a high standard.	[5]–[6]
Candidates use some appropriate specialist terms to describe how a heart attack occurs (using three or four of the above points). They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates describe how a heart attack occurs. However, the description is not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

12

					AVAILABLE MARKS
9	**(a)**	**(i)**	As wind increases, the rate of transpiration increases;	[1]	
		(ii)	As the temperature increases, the rate of transpiration increases; As the humidity increases, the rate of transpiration decreases;	[2]	
	(b)	**(i)**	To prevent water evaporation <u>from the pot/soil</u>;	[1]	
		(ii)	(257.6 – 185.6)/or ÷ 24 [1] **or** 3 g per hour	[2]	
		(iii)	Less surface area/less stomata So less evaporation/diffusion of water	[2]	
		(iv)	• Photosynthesis • Support • Transport (Any **two**)	[2]	10
10	**(a)**	**(i)**	DNA;	[1]	
		(ii)	Two nuclei or two cells drawn; Two chromosomes in each; Chromosomes identical to parents;	[3]	
	(b)	**(i)**	Punnett square; Hh; hh; Correct cross;	[4]	
		(ii)	50:50 or 1:1/ 2:2;	[1]	9
				Total	**90**

	H	h
h	Hh	hh
h	Hh	hh

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Rewarding Learning

General Certificate of Secondary Education
2013

Double Award Science: Biology

Unit B2

Foundation Tier

[GSD41]

WEDNESDAY 5 JUNE, AFTERNOON

MARK SCHEME

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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.

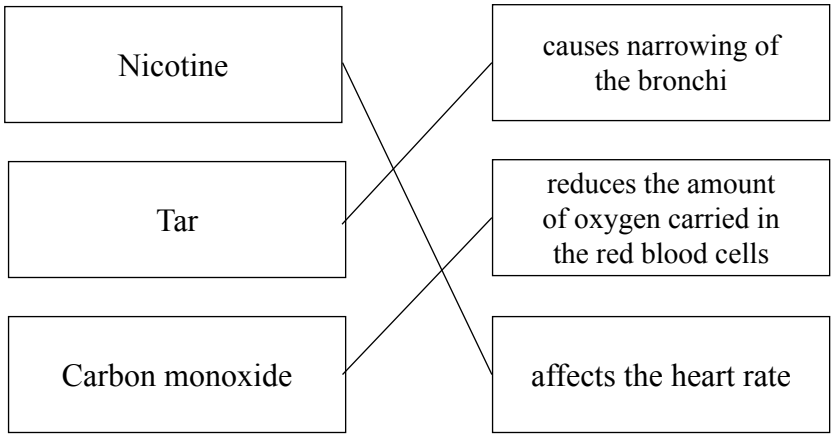
The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends 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)



1 correct = [1]
All three correct = [2] [2]

(b) (i) Less adults smoking/decreased/the % of adults smoking decreased;
The number of cases of lung cancer decreased;
More smokers = more cases of lung cancer; [2]
Both lines decrease = [1]

(ii) Smoking ban in public places/labelling on cigarette packets/ban on advertising/TV/sport venues/age limit to buy cigarettes/proving age to buy cigarettes/cigarettes not on display; [1]

(iii) Tar; [1]

(c) An individual's health – damage to liver/**liver** cancer/cirrhosis/depression;

Society – cost to NHS/family conflict/violence/unwanted pregnancies/money spent to educate/treat people/working days lost/anti-social behaviour/ vandalism/extra policing; [2]

(d) (i) She drinks **more** than the recommended **daily allowance**/she drinks **8.8 units**; at **one time** (on one night); [2]

(ii) Any **two** from
- Increase price of alcohol/no special offers/no happy hours;
- More police presence to monitor/check IDs
- Education/show effects of drink/adverts
- Bar staff refuse to serve people when they have had too much to drink/stop serving alcohol earlier/close earlier
- Get young people involved in something else/drop-in centres [2]

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		AVAILABLE MARKS
2	**(a)** Any **two** from Section of/a short length; of a chromosome/DNA; codes for a protein; inherited/from your parents like eye colour; [2]	
	(b) Length of nails; [1]	
	(c) Height; [1]	
	(d) Continuous; [1]	5

3

Feature	Type of cell division	
	Mitosis	Meiosis
Exact copy made of cells	✓	✗
Used to replace damaged cells	✓	✗
Produces 4 haploid cells	✗	✓

([1] for each correct row, do not penalise if no ✗) [3] 3

4 **(a)** (Correct gametes for parents)
- H and h;
- h and h;
- Punnett square constructed (┼);
- Correct cross for offspring from this cross (2Hh, 2hh); Apply CM [4]

(b) Phenotypes = long hair and short hair;
Ratio 1:1 or 2:2 or 50%:50%; Apply CM
If cross correct but phenotypes not specified, allow ratio from their Punnett
If cross wrong **must** specify phenotypes in order to get ratio marks [2] 6

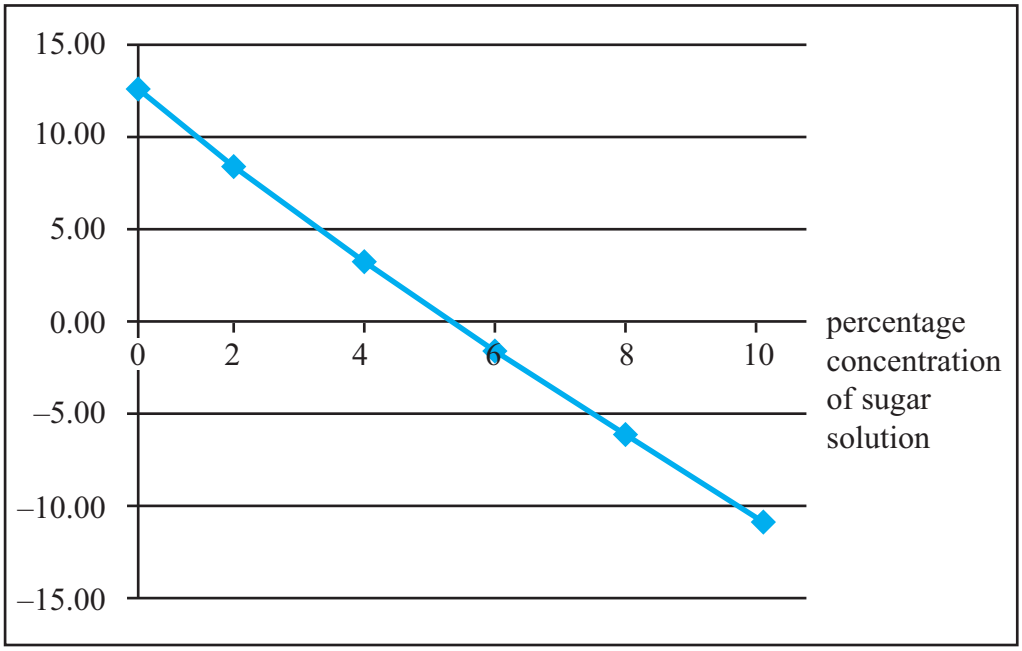
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AVAILABLE MARKS

5 **(a)** **(i)** Change in mass = –0.7;
Percentage change in mass = **(–0.7/6.7)**; × **100** **= –10.44%)**; [3]

(ii) **Initial/starting** masses were different/easier to compare; [1]

(b) **(i)** Plotted correctly (5 or 6 points = [2]; 3 or 4 = [1]);
Line drawn; [3]



(ii) Concentration of sugar solution from graph = 5.4% – **from their graph**;

Explanation: no change in mass/concentration of sugar solution inside the carrot = same as concentration of sugar solution outside/ no movement of water/no osmosis; [2] 9

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AVAILABLE MARKS

6 **(a)** To prevent evaporation of water <u>from the flask</u>/beaker/from surface of water

(b) **Indicative content**

- Record the mass of the apparatus containing the plant <u>initially</u>/<u>at start</u>
- Leave for a given time
- Record mass at end/change in mass/take final mass from original
- <u>Divide</u> change in mass <u>by time</u> (to work out rate)
- A named variable constant – temperature/humidity/wind speed/same type/species of plant
- Repeat with reduced surface area/remove leaves/less leaves/smaller/larger leaves
- Keep **another** variable constant – temperature/humidity/wind speed/same type/species of plant
- Repeat for reliability, repeat to get average

Response	Mark
Candidates must use appropriate specialist terms throughout to describe how they would use this apparatus and explain in logical sequence, how to compare the rate of water uptake for a plant with a large surface area and then a reduced surface area (using **five or more** of the above points). They use good spelling, punctuation and grammar and form and style are of a high standard.	[5]–[6]
Candidates use some appropriate specialist terms to describe how they would use this apparatus and explain in logical sequence, how to compare the rate of water uptake for a plant with a large surface area and then a reduced surface area (using **three or four** of the above points). They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates give some explanation of how they could use this apparatus, using at least one of the above points. However they are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

[6]

(c) Greater water uptake/loss in mass for plant with **larger** surface area of leaves; or converse
More evaporation/**more** transpiration of water/**more** stomata/**more** pores (with more leaves); or converse [2]

(d) Line on graph = greater gradient;
still starts at zero; [2]

(e) Any **two** from

- support/turgor/stop wilting
- transport/movement of minerals
- transpiration
- photosynthesis [2]

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AVAILABLE MARKS

7 **(a)** **(i)**

Secondary sexual characteristics	Males	Females	Both	
Growth of breasts		✓		;
Growth of pubic hair			✓	;
Voice deepens	✓			;
Hips widen		✓		; [4]

(ii) Testes – testosterone;
Ovaries – oestrogen; [2]

(iii) Haploid/23 chromosomes;
restores diploid number in zygote/to give 46 chromosomes;
or
tail;
swim (to egg); [2]

(b) oviduct;
mitosis;
uterus;
foetus;
amniotic fluid;
placenta; [6]

(c) **Indicative content**
Any **three** correct methods named:

- Rhythm method/abstinence
- Femidom/female condom
- (Hormone) implant/**hormone** injection
- Coil
- (Contraceptive) pill
- **Morning after** pill
- Condom
- Diaphragm/cap
- Vasectomy/sterilisation
- Female sterilisation

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Explanations:
(Condom)
– prevents **sperm meeting egg/getting into oviduct**
Not stops sperm getting into body
(Pill)/(hormone implant)
– prevents ovulation;
(Vasectomy)
– sperm ducts cut/tied; egg and sperm can't meet/no sperm in ejaculate
Not no sperm produced
(Female sterilisation)
– oviducts/Fallopian tubes cut/tied;
– egg and sperm can't meet
Not no eggs produced
(Diaphragm/femidom)
– placed in vagina;
– egg and sperm can't meet;
(Cap)
– placed over cervix;
– egg and sperm can't meet;
(Coil)
– placed inside uterus; prevents implantation;
(Rhythm/abstinence)
– sperm and egg can't meet/no fertilisation;

Response	Mark
Candidates must use appropriate specialist terms throughout to name **at least two** methods of contraception and describe how each prevents pregnancy. They use good spelling, punctuation and grammar and form and style are of a high standard.	[5]–[6]
Candidates use some appropriate specialist terms to name **one or two** methods of contraception and describe how each prevents pregnancy (account must include at least one description of how pregnancy is prevented). They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates name **one** or **two** methods of contraception or give one method and describe how it prevents pregnancy. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1]–[2]
Response not worthy of credit	[0]

[6]

AVAILABLE MARKS

20

					AVAILABLE MARKS
8	**(a)**	**(i)**	Blood passes through the heart twice; to go round the body once; [2]		
		(ii)	X – pulmonary artery; Y – hepatic vein; [2]		
	(b)	**(i)**	Cholesterol/fat/atheroma; [1]		
		(ii)	Lack of oxygen/glucose; Less respiration/less energy; Heart (muscle) cells die/heart **muscle** dies/a section of heart dies; Any **two** [2]		
		(iii)	**10** times the risk; [1]		
		(iv)	Reduced the risk from 4 to 2 times/half the chance/50% less; [1]		
	(c)		Brain; [1]		10
9	**(a)**		Use a condom/abstinence/fewer partners/don't share needles/don't use dirty needles/use sterilised needles; Athlete's foot; Bacteria; Airborne droplet infection/in the air/breathing in/airborne/sneezing/coughing; [4]		
	(b)		Blood clotting = prevents microorganisms from entering a cut; (Ignore blood loss) Mucous membrane = **traps** microbes/microbes stick to/in mucus/mucus catches microbes; Phagocytosis = engulfs/surrounds; and digests/breaks down microorganisms; [4]		
	(c)		• Antibodies attach to **antigen**; • because antibodies are specific/fit/match/complementary to A; • Cause the bacteria (A) to clump together; • Prevents microorganisms dividing/reproducing/easier for phagocytosis/moving around the body/immobilises; • Antibodies not a match/fit/specific to/complementary for antigens on B; Any **four** [4]		12
				Total	**90**

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