Rewarding Learning

General Certificate of Secondary Education
January 2019

GCSE Biology

Unit 2

Higher Tier

[GBY22]

TUESDAY 22 JANUARY, MORNING

MARK SCHEME

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

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

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

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

					AVAILABLE MARKS
1	**(a)**	**(i)**	Towards the heart; [1]		
		(ii)	Valves; [1] Prevent blood from moving backwards/away from the heart; [1] [2]		
	(b)		*Artery* – Thicker layer A; [1] More elastic/muscle fibres; [1] Withstand pressure; [1] Accept converse for vein; [3]		6
2	**(a)**		Transpiration; [1]		
	(b)	**(i)**	Use a fan; [1]		
		(ii)	72 ÷ 24; [1] = 3; [1] [2]		
		(iii)	Any **two** from: More evaporation/diffusion; [1] Greater gradient for water loss/more water blown away from leaf/ described; [1] More energy for water loss; [1] [2]		
	(c)		Temperature/humidity/light; [1]		7

3 **(a)** Plasmolysed [1]

(b) **Indicative Content**

1. Water enters the cells;
2. Through selectively/partially permeable membrane;
3. By osmosis;
4. High water concentration to low water concentration/dilute solution to concentrated solution;
5. Vacuole/cytoplasm increases in volume;
6. Cytoplasm pushes against cell wall;
7. Cell wall resists expansion;
8. Causes turgor pressure/cell becomes turgid;

Band	Response	Mark
A	Candidates **must use appropriate, specialist terms** throughout to describe and explain their conclusions **using <u>at least 5</u> of the points**. They use **good** spelling, punctuation and grammar and the form and style are of a **high standard**.	[5]–[6]
B	Candidates **use some appropriate, specialist terms** throughout to describe and explain their conclusions **using <u>at least 3</u> of the points**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory standard**.	[3]–[4]
C	Candidates make **little use of specialist terms** throughout to describe and explain their conclusions **using <u>at least 1</u> of the points**. The spelling, punctuation and grammar, form and style are of a **limited standard**.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 7

4 **(a)** Pulse rate increases; [1]
More oxygen/glucose; [1]
To muscles; [1]
For energy/respiration; [1] [4]

(b) **Running:**
Increases pulse rate faster; [1]
Causes higher maximum pulse rate; [1]
Pulse rate rises continuously/does not level off; [1] [3] 7

AVAILABLE MARKS

					AVAILABLE MARKS
5	**(a)**	Platelet; [1] Plasma; [1] White blood cell; [1]		[3]	
	(b)	**(i)** Iron;		[1]	
		(ii) Iron binds to haemoglobin; [1] (Haemoglobin) carries oxygen; [1]		[2]	
		(iii) No nucleus; [1] Biconcave shape/large surface area; [1]		[2]	
	(c)	Conversion of fibrinogen to fibrin; [1] Formation of clot (described)/scab; [1]		[2]	10
6	**(a)**	**(i)** Ovary;		[1]	
		(ii) Fertility drug/hormones;		[1]	
		(iii) Check dividing/not damaged/no genetic defects;		[1]	
		(iv) Against religious belief to remove damaged embryo;		[1]	
		(v) Implantation;		[1]	
	(b)	**(i)** [Thin wall of blood vessel in placenta; [1] Short diffusion pathway; [1] [Villi/loops of foetal blood vessels; [1] Large surface area for absorption; [1] [Good blood supply; Maintains a concentration gradient; Any two pairs		[4]	
		(ii) Umbilical artery carries urea/CO_2 to mother;		[1]	10

7 **(a)** Jenner; [1]

(b) **(i)** 92.70 < 92.73; [1]

(ii) Increased number; [1]
Fewer vaccinated; [1] [2]

(c) **Indicative Content**

1. Given a weakened form of pathogen/virus;
2. Does not cause the disease;
3. Has antigens present on surface;
4. Causes lymphocytes to be stimulated;
5. Produce antibodies (specific to the antigens);
6. Cause memory lymphocytes to be produced;

Band	Response	Mark
A	Candidates **must use appropriate, specialist terms** throughout to describe and explain their conclusions **using <u>at least 5</u> of the points**. They use **good** spelling, punctuation and grammar and the form and style are of a **high standard**.	[5]–[6]
B	Candidates **use some appropriate, specialist terms** throughout to describe and explain their conclusions **using <u>at least 3</u> of the points**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory standard**.	[3]–[4]
C	Candidates make **little use of specialist terms** throughout to describe and explain their conclusions **using <u>at least 1</u> of the points**. The spelling, punctuation and grammar, form and style are of a **limited standard**.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

(d) **(i)** Receive readymade antibodies; [1]

(ii) No memory cells present/antibodies break down quickly; [1]

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AVAILABLE MARKS

				AVAILABLE MARKS
8	**(a)**	(2 ÷ 20) × 100; [1] 10%; [1]	[2]	
	(b)	Any **three** from: Most bacteria A killed by antibiotic; Resistant bacteria B survive; B able to reproduce; Pass on genes to offspring/next generation;	[3]	
	(c)	**(i)** Natural selection/survival of the fittest;	[1]	
		(ii) Die out/become extinct;	[1]	7
9	**(a)**	**(i)** Smoking;	[1]	
		(ii) High blood pressure; [1] from 8% to 62%; [1]	[2]	
		(iii) Lack of exercise/stress/obesity;	[1]	
	(b)	Reduced/no blood flow to brain cells; [1] No oxygen/sugar; [1] No respiration/energy production; [1] Brain cells die; [1]	[4]	8
10	**(a)**	Sugar; phosphate; Base **pairing**/A pairs with T/C pairs with G; Double helix;	[4]	
	(b)	**(i)** 900 ÷ 3; 300;	[2]	
		(ii) Base triplet now TAG; [1] Amino acid 2 becomes amino acid 4; [1] Incorrect sequence of amino acids; [1] Different/wrong protein made; [1]	[4]	10

				AVAILABLE MARKS
11	**(a)**	Pedigree diagram;	[1]	
	(b)	**(i)** Only expressed in homozygous state/in absence of dominant allele;	[1]	
		(ii) Carried on X chromosome;	[1]	
	(c)	Megan X^B X^B; [1] Mick X^B Y; [1]	[2]	
	(d)	Colour-blind (male);	[1]	
	(e)	Audrey receives X^B from her mother/Megan; [1] She receives X^b from her father/Peter; [1]	[2]	
	(f)	**(i)** Audrey gametes X^B and X^b; [1] David gametes X^B and Y; [1] Punnett square correctly completed [1 mark per row/column]; [2]	[4]	
		(ii) 50% / ½;	[1]	
	(g)	Would have to receive X^b from each parent; [1] Father would have to be colour-blind; [1] and mother a carrier; [1]	[3]	16
12	**(a)**	Fungus;	[1]	
	(b)	**(i)** Graph drawn: Points plotted; [2] Line drawn; [1]	[3]	
		(ii) Takes time for fungus to reproduce/not enough penicillium;	[1]	
		(iii) Lack of glucose/oxygen/build-up of toxins;	[1]	
	(c)	**(i)** Gene inserted; [1] Drawn appropriately; [1]	[2]	
		(ii) Restriction;	[1]	
		(iii) Any **three** from: Will cut at same sequence of bases; Produces sticky ends; Gene and plasmid complementary; Base pairing can occur/described;	[3]	
		(iv) Plasmid placed into bacterium; [1] Bacteria reproduce/ Form bacteria containing insulin gene/with modified plasmid; [1] (Bacteria) produce human insulin; [1]	[3]	15
			Total	**115**