Rewarding Learning

General Certificate of Secondary Education
2014

GCSE Biology

Unit 2

Higher Tier

[GBY22]

MONDAY 16 JUNE, 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)**		Similarity – Both have genetic material;	[1]	
			Difference – Any **one** from: TB has double stranded genetic material, HIV single stranded; TB has cell wall, HIV has protein layers; TB has plasmids, HIV does not;	[1]	
	(b)		Droplets in saliva by **coughing/sneezing**;	[1]	
	(c)		Spread – Sexual **intercourse**/blood to blood contact [described];	[1]	
			Prevented – Condom/abstinence/screening blood;	[1]	5
2	**(a)**	**(i)**	Similarity – [AGE] Death from CHD increases with age;	[1]	
			Difference – [GENDER] More men than women die from CHD;	[1]	
		(ii)	More women in population/lower population;	[1]	
	(b)		Don't smoke (cigarettes); exercise (regularly); avoid stress; **Reduce** salt/sugar/fat/cholesterol/alcohol; (Any **two**)	[2]	5
3	**(a)**		Any **three** Use quadrats/Random sampling; Weigh fruits; Record on table/tally chart;	[3]	
	(b)	**(i)**	**Continuous** (variation);	[1]	
		(ii)	Histogram;	[1]	
	(c)		Any **one** Most strawberries between 10.0 and 11.9; Data/range described;	[1]	6
4	**(a)**	**(i)**	Cell vacuole/nuclear **membrane**;	[1]	
		(ii)	Lets water/some/certain/small substances to pass through;	[1]	
	(b)	**(i)**	Nucleus correct shape and position; Smaller vacuole; Cell membrane away from cell wall;	[3]	
		(ii)	Plasmolysed/plasmolysis;	[1]	6

5 Indicative content:

1 Blood flow to heart increased 3 times/from 250 to 750;
2 (Heart increases) to pump blood;
3 Blood to muscles increases × 10/from 1200 to 12 000;
4 More oxygen/glucose/sugar needed for respiration/energy;
5 Blood flow skin increases 500 to 2000/intestines decreases 3100 to 1500;
6 Because blood diverted towards/away from (named organ);

Or

7 Total blood flow increases from 5050 to 16 250;
8 Due to increased cardiac output;

Response	Marks
Candidates **must use appropriate, specialist terms throughout** to describe and explain the effect of exercise on blood flow **using at least FIVE of the points above**. They use **good** spelling, punctuation and grammar and the form and style are of a **high** standard.	[5]–[6]
Candidates use **some appropriate, specialist terms throughout** to describe and explain the effect of exercise on blood flow **using at least THREE of the points above**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory** standard.	[3]–[4]
Candidates **make little use of specialist terms throughout** to describe and explain the effect of exercise on blood flow **using at least ONE of the above points**. The spelling, punctuation and grammar, form and style are of a **limited** standard.	[1]–[2]
Response not worthy of credit	[0]

[6] 6

6 (a) Patch must be homozygous recessive/hh;
Patch **must get** recessive allele from **each** parent;
But each parent suffers so **must also have dominant allele/H**; [3]

(b) Test cross;
With normal/double recessive/hh/Patch;
Willow is either homozygous dominant/HH or heterozygous/Hh;
If Willow homozygous offspring all suffer from PKD;
If Willow is heterozygous/Hh,
Some offspring will be normal; [5] 8

AVAILABLE MARKS

					AVAILABLE MARKS
7	**(a)**	**(i)**	Down syndrome;	[1]	
		(ii)	Extra chromosome; chromosome 21;	[2]	
		(iii)	23 pairs of chromosomes;	[1]	
		(iv)	(X and Y) chromosomes present;	[1]	
	(b)	**(i)**	Amniotic fluid;	[1]	
		(ii)	Amniocentesis;	[1]	
		(iii)	Avoid damaging baby with syringe;	[1]	
		(iv)	Should mother have abortion if baby has condition; risk of miscarriage; free choice whether to screen or not; (Any **two**)	[2]	10
8	**(a)**	**(i)**	Antigen;	[1]	
		(ii)	Antibody–antigen reaction; clumping of the bacteria;	[2]	
	(b)	**(i)**	Memory cells produced;	[1]	
		(ii)	Secondary response (Antibody level) longer lasting; more antibodies produced;	[2]	
		(iii)	Primary antibody concentration starts to drop; Primary response antibody level below required for immunity/ converse for secondary;	[2]	
		(iv)	Expensive/time-consuming/some people don't go back for second injection/can catch disease between injections;	[1]	
		(v)	So bacteria cannot cause disease; still triggers antibody/memory cells/production;	[2]	
		(vi)	Artificial/active;	[1]	12
9	**(a)**		Any **two** from: Thin **walls**/one cell thick; Permeable walls; High pressure;	[2]	
	(b)		Carbon dioxide/urea/water;	[1]	
	(c)		Lymph; Returned to bloodstream;	[2]	5

				AVAILABLE MARKS
10	**(a)**	Any **four** Diameter decreases/cell shrunk; lost water; by osmosis; from dilute to concentrated solution/more water inside cell/concentration gradient described; through a selectively permeable membrane;	[4]	
	(b)	Any **four** No change in diameter of red blood cell in solution B; (B) Concentration inside and outside cell equal/isotonic; Water neither enters nor leaves cell; Water enters red blood cells in solution C; Cells burst/lyse;	[4]	8
11	**(a)**	Sugar; phosphate;	[2]	
	(b)	**(i)** Same A as T; Same G as C; More A–T than G–C; A greatest/C lowest; Other appropriate response; (Any **three**)	[3]	
		(ii) 100 – 42; 58 ÷ 2 = 29;	[2]	
	(c)	Franklin and Wilkins; Watson and Crick; Franklin and Wilkins took X-ray photos; Watson and Crick made models;	[4]	11
12	**(a)**	**(i)** A – red blood cell;	[1]	
		B – white blood cell;	[1]	
		(ii) Transport oxygen;	[1]	
		(iii) Biconcave (shape/disc); Large surface area/faster gas exchange;	[2]	
		(iv) Fibrinogen; changed to fibrin; (Fibrin) mesh traps red blood cells;	[3]	
	(b)	**(i)** Iron;	[1]	
		(ii) Less haemoglobin; to carry oxygen; for respiration;	[3]	
	(c)	**(i)** Platelets;	[1]	
		(ii) Plasma;	[1]	
		(iii) Group AB has smallest stock level; but lasts the greatest number of days; AB must be small proportion of population/rare blood group;	[3]	17

13 (a) (i) Fleming; [1]

(ii) Fungus/mould; [1]

(iii) Isolated a pure/powder form (of penicillin);
(Helped to) develop large scale/industrial production; [2]

(b) Indicative content:
1 Antibiotic (A) kills most of the bacteria;
2 Bacteria that survive have a **mutation**;
3 Makes them **resistant** to antibiotic A;
4 Resistant/surviving bacteria reproduce;
5 Resistant gene passed on to offspring;
6 making **whole colony resistant**;
7 Those that survive treatment with antibiotic **B** are resistant to both;
8 Superbugs have resistance to several antibiotics;

Response	Mark
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Candidates use **some appropriate, specialist terms** throughout **using at least THREE of the above points**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory** standard.	[3]–[4]
Candidates make **little use of specialist terms** throughout **using at least ONE of the above points**. The spelling, punctuation and grammar, form and style are of a **limited** standard.	[1]–[2]
Response not worthy of credit.	[0]

[6]

(c) (i) Deaths increase until **2008**/highest at **2008**;
Reduce/decline/fall/go down; [2]

(ii) More frequent use of antibiotics;
new strains of bacteria present; [1]

(iii) Any **three** from:
Washing hands/using alcohol hand gel;
Intensive cleaning/sterilising of equipment;
Using disposable/freshly laundered (sterilised) clothing;
Restricted use of antibiotics;
Isolation of infected patients; [3]

Total

AVAILABLE MARKS

16

115