



Rewarding Learning

**General Certificate of Secondary Education
2013**

Biology

Unit 2

Foundation Tier

[GBY21]

TUESDAY 18 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) Any two from: (Lung) cancer; Bronchitis; Emphysema;	[2]	4
	(b) Reduced oxygen carrying capacity/transport/for cells (respiration);	[1]	
	(c) Nicotine;	[1]	
2	No/none; Thick; One cell (thick)/thin; Low;	[4]	4
3	(a) 50 cm;	[1]	5
	(b) 10; and 16 years;	[2]	
	(c) Mitosis;	[1]	
	(d) Increased (cell) mass;	[1]	
4	(a) Percentage of women surviving has increased; 84.5% to 90.6%/by 6.1%;	[1] [1]	5
	(b) Any two from: Early detection; Smaller tumour/less cancer cells; Less likely to have spread; Easier to treat/operate on/remove;	[2]	
	(c) Surgery/radiotherapy/chemotherapy;	[1]	
5	(a) Accurate plots; categories labelled; y-axis scale;	[3]	6
	(b) (i) Bar chart;	[1]	
	(ii) Discontinuous;	[1]	
	(iii) Genetic/inherited;	[1]	

6 Indicative content:

- 1 Thin/permeable membrane;
- 2 O₂ can pass in and out of cell;
- 3 Biconcave shape/large surface area;
- 4 Faster O₂ uptake/diffusion into/release from cell;
- 5 Haemoglobin;
- 6 Binds to oxygen (when in high concentration);
- 7 Lacks/no nucleus;
- 8 More volume/space for haemoglobin/O₂ transport;
- 9 Flexible/small size;
- 10 Able to move through capillaries;

Each explanation must be in the context of appropriate adaptation to be awarded.

Response	Marks
Candidates must use appropriate, specialist terms throughout to describe and explain how a red blood cell is adapted to oxygen transport using AT LEAST FIVE OF the above points . They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates must use appropriate, specialist terms throughout to describe and explain how a red blood cell is adapted to oxygen transport 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 must use appropriate, specialist terms throughout to describe and explain how a red blood cell is adapted to oxygen transport 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

7 (a) T, A, G;

[2]

(b) Sugar;

[1]

(c) Double helix;

[1]

(d) Nucleus;

[1]

5

			AVAILABLE MARKS		
8	(a) (i)	1 in 100;	[1]	8	
	(ii)	Any two from: Forgetting to take it (on time); Upset stomach/sick/vomiting/diarrhoea; Other medication may affect it; Other appropriate response;	[2]		
	(iii)	Advantage: Any one from: Convenient; Does not interrupt sexual intercourse; Reduces premenstrual pain; Reduces bleeding; Protects against some cancers; Other appropriate response; Disadvantage: Any one from: May increase risk of blood clotting, breast cancer or cervical cancer; May cause headaches; May cause tender breasts; Other appropriate answer;	[2]		
	(iv)	Male sterilisation; Female condom;	[2]		
	(b)	Surgical;	[1]		
9	(a) (i)	Different form of gene ;	[1]		10
	(ii)	Meiosis;	[1]		
	(b) (i)	Punnett square;	[1]		
	(ii)	Gametes: Pamela – n, Tony – N; Offspring correct: NN, Nn, Nn, nn; Accept: ECF (after wrong gametes given)	[1] [2]		
	(iii)	3:1;	[1]		
	(iv)	Half/50%;	[1]		
	(v)	Could be NN; or Nn;	[2]		

10 (a) Prevent evaporation from (surface of) water; [1]

(b) **Indicative content:**

- 1 Water absorbed by plant roots;
- 2 By osmosis;
- 3 Passes up stem/to leaves;
- 4 Evaporates from mesophyll cells;
- 5 Diffuses;
- 6 Across/through air spaces;
- 7 Leaves through stomata;
- 8 Transpiration;

Response	Marks
Candidates must use appropriate, specialist terms throughout to describe and explain how the plant causes the loss of mass in the flask using AT LEAST FIVE OF the above points . They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates must use appropriate, specialist terms throughout to describe and explain how the plant causes the loss of mass in the flask 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 must use appropriate, specialist terms throughout to describe and explain how the plant causes the loss of mass in the flask 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) Any **one** from:

- Only one variable changed;
- Same time/duration;
- Same volume of water in flask;
- Same shoot/plant;
- Same volume of oil;
- Same temperature;

[1]

(d) $12 \div 24$;

[1]

0.5 (g per hour);

[1]

(e) Greater loss in mass of flask in windy conditions;

[1]

48 g vs 12 g/2 g per hour vs 0.5 g per hour;

[1]

(f) Use a fan;

[1]

(g) Temperature;

Humidity;

[1]

Light/dark;

[1]

AVAILABLE
MARKS

15

			AVAILABLE MARKS	
11	(a) (i)	Head/nucleus;	[1]	5
	(ii)	Contains half the number of chromosomes/haploid; Accept: Contains enzymes to help entry into egg;	[1]	
	(iii)	Tail/flagellum;	[1]	
	(iv)	Some are further away (from camera) than others/reference to 3D image;	[1]	
	(b)	Zygote;	[1]	
12	(a) (i)	Bar workers' health has improved; Any one from: Eye irritation from 82% to 51%/31% less; Sneezing from 75% to 34%/41% less; Coughing from 87% to 67%/20% less;	[2]	5
	(ii)	Sneezing;	[1]	
	(b)	Reduces passive smoking/the amount of smoke in the air they are forced to breathe in;	[1]	
	(c)	Freedom of choice/rights of the smoker/fall in revenue;	[1]	
13	(a)	D;	[1]	6
		B;	[1]	
	(b)	Artificial – Infected/injected/introduced by man ;	[1]	
		Active – body/patient/person who is being vaccinated produces own antibodies ;	[1]	
	(c)	Engulf bacteria/viruses; Digest bacteria/viruses;	[2]	

14 Indicative content:

Maximum of **two** from points 1, 2 and 3.

- 1 Y;
- 2 Has largest (diameter of) clear zone/correct (comparative) measurement of Y clear zone (diameter);
- 3 More **bacteria** are killed/affected/the less resistant the bacterium is to the antibiotic;

Maximum of **two** from points 4, 5 and 6.

- 4 Water is control/for comparison with the antibiotic solutions;
- 5 Concentration of antibiotic solution/size of filter paper/incubation time/nutrient agar/type or amount of bacteria/temperature, [kept constant/same/controlled];
- 6 Only one variable changed/investigated;

Maximum of **two** from points 7, 8 and 9.

- 7 Incubated at 20 °C **or below**;
- 8 Seal plates/don't open plates;
- 9 Sterile [/sterilise] apparatus [/equipment/agar]/aseptic techniques described;

AVAILABLE MARKS

Response	Marks
Candidates must use appropriate, specialist terms throughout to explain the conclusion and why the experiment was a fair test 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 explain the conclusion and why the experiment was a fair test 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 explain the conclusion and why the experiment was a fair test using AT LEAST ONE of the points above . The spelling, punctuation and grammar, form and style are of a limited standard.	[1]–[2]
Response not worthy of credit.	[0]

[6]

6

Total

90