Rewarding Learning

General Certificate of Secondary Education
2015

# Biology

Unit 1

Higher Tier

**[GBY12]**

**FRIDAY 5 JUNE, AFTERNOON**

# 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)** | Plants grow from apices/growing points; [1]<br>Produce/in a branching pattern; [1]<br>Animals grow all over; [1] | | [3] | |
| | **(b)** | *Digestive system* – (Organ) system; [1]<br>*Eye* – Organ; [1] | | [2] | 5 |
| **2** | **(a)** | Trachea; [1]<br>Diaphragm; [1] | | [2] | |
| | **(b)** | *Description* – Balloons deflate/described; [1]<br>*Explanation* – Reduced volume (inside bell jar); [1]<br>Increased pressure/forces air out; [1] | | [3] | 5 |
| **3** | **(a)** | **(i)** Sweep/wave/drag (back and forth/side to side/figure of eight) [1]<br>Through/over the grass; [1] | | [2] | |
| | | **(ii)** Any **two** from:<br>Same net;<br>Sweep net same length of time/number of times;<br>Same day/time of day;<br>Same size of area; | | [2] | |
| | **(b)** | Pitfall trap; | | [1] | 5 |

**4** **Indicative content**

1. Sugar/glucose present;
2. Benedict's solution changes from **blue to** brick red;
3. Fats/lipids present;
4. Ethanol changes from **clear to** white (emulsion);
5. Starch present;
6. Iodine changes from **yellow/brown to** blue/black;
7. Protein absent;
8. No colour change of Biuret;

| Response | Marks |
|---|---|
| Candidates **must use appropriate, specialist terms throughout** to describe and explain their conclusions **using at least SIX** of the above points. 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 their conclusions **using at least 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 **make little use of specialist terms throughout** to describe and explain their conclusions **using at least TWO** 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

| | | | | | AVAILABLE MARKS |
|---|---|---|---|---|---|
| **5** | **(a)** | A – Cuticle [1]<br>B – Palisade (mesophyll); [1]<br>C – Spongy mesophyll [1]<br>D – Guard (cell); [1] | | [4] | |
| | **(b)** | Not visible in this section/in another section of the cell; | | [1] | |
| | **(c)** | Large surface area/(contact with) air spaces; | | [1] | |
| | **(d)** | Any **two** from:<br>Nearer the (upper) surface/(sun)light;<br>Palisade cells end on/at right angles to light/tightly packed;<br>Contains **more** chloroplasts; | | [2] | 8 |
| **6** | **(a)** | **(i)** Phototropism; | | [1] | |
| | | **(ii)** Auxin; | | [1] | |
| | **(b)** | Any **three** from:<br>Auxin/hormone produced at tip/moves down the stem;<br>Unequal amount of auxin/more on shaded side;<br>**Cell elongation** on shaded side;<br>Growth towards light/bends towards light; | | [3] | |
| | **(c)** | *Description:*<br>shoots/seedlings grow straight/don't grow towards light; [1]<br>*Explanation:*<br>Any **two** from:<br>equal light on all sides;<br>equal amounts of auxin on all sides;<br>cell elongation same on all sides/growth same on all sides; [2] | | [3] | 8 |
| **7** | **(a)** | **(i)** High fat (content); [1]<br>High sugar (content); [1] | | [2] | |
| | | **(ii)** **Energy intake** (greater) than **energy used** (in exercise); | | [1] | |
| | | **(iii)** Any **two** from:<br>Strokes;<br>Heart attacks/CHD/heart disease;<br>High blood pressure; | | [2] | |
| | | **(iv)** Proportion/percentage/number of boys **and** girls with **healthy** weight **decreases**; [1]<br>Proportion/percentage/number of boys **and** girls who are **obese increases**; [1] | | [2] | |
| | | **(v)** Proportion/percentage/number of **overweight boys decreases** while proportion/percentage/number **overweight girls increases**; [1]<br>Greater proportion/percentage/number of **boys obese than girls**/healthy weight in boys decreases more; [1]<br>Needs **comparison** between boys and girls<br>**Accept** – More girls **overweight** than boys; | | [2] | |

| | | | | | AVAILABLE MARKS |
|---|---|---|---|---|---|
| | **(b)** | **(i)** | Both the number of people suffering obesity and diabetes increases (2008 to 2010) | [1] | |
| | | **(ii)** | 2010/2011 to 2012 number suffering from obesity falls but number suffering diabetes rises/continues to rise; | [1] | 11 |
| **8** | **(a)** | | Lacteal; | [1] | |
| | | | Absorb fats; | [1] | [2] |
| | **(b)** | | (Dense) capillary network/good blood supply; | [1] | |
| | | | **Carries away** absorbed products of digestion; | [1] | [2] |
| | **(c)** | | Finger-like shape/microvilli; | [1] | |
| | | | Increase surface area; | [1] | [2] |
| | | | **or** | | |
| | | | Thin epithelium/epithelium one cell thick; | | |
| | | | Short diffusion distance; | | |
| | | | **or** (accept if not given in **(b)**) | | |
| | | | good blood supply; carries away absorbed products/maintains concentration gradient | | 6 |
| **9** | **(a)** | | Any **four** from: | | |
| | | | A { Burning fossil fuels; Produces (extra) $CO_2$; | | |
| | | | B { Deforestation; Reduced **absorption**/use of $CO_2$ (by photosynthesis); Reject: photosynthesis unqualified. | | |
| | | | $CO_2$ concentration (in atmosphere) increases; | | [4] |
| | **(b)** | **(i)** | Trend in number of storms increases from 6 to 8; | [1] | |
| | | | Agrees with/predicted by global warming/global warming predicts storms/irregular weather; | [1] | [2] |
| | | **(ii)** | Varies/up and down/2000–2002/2004–2006/reduced number; | [1] | |
| | | | Disagrees with/contrary to global warming predictions; | [1] | [2] |
| | | **(iii)** | Continue measurements over longer period of time/other scientists try to repeat the same/similar measurements; | [1] | 9 |
| **10** | **(a)** | **(i)** | Producers at bottom (centred and labelled)/key used; | [1] | |
| | | | Accurate plots (using given scale) × 2 | [2] | [3] |
| | | **(ii)** | *Advantage* – Takes account of **size** of organism; | [1] | |
| | | | *Disadvantage* – Difficult/destructive to measure; | [1] | [2] |
| | **(b)** | **(i)** | (123 ÷ 3000) × 100; | [1] | |
| | | | 4.1 (%); | [1] | [2] |
| | | **(ii)** | Any **two** from: | | |
| | | | Energy lost to respiration/heat; | | |
| | | | Movement; | | |
| | | | Excretion; | | |
| | | | Parts of the plant can't be digested/eaten; | | [2] |

| | | | | | AVAILABLE MARKS |
|---|---|---|---|---|---|
| | **(iii)** | People are acting as primary consumers rather than secondary/ 2nd v 3rd trophic levels/3000 v 123 kJ energy; [1]<br>Less energy lost/more energy available/3000 v 123 kJ energy; [1]<br>More efficient | | [2] | 11 |
| **11** | **(a)** | Increase surface area; [1]<br>for enzymes to act on; [1] | | [2] | |
| | **(b)** | **(i)** Temperature; | | [1] | |
| | | **(ii)** Place tubes in a waterbath; | | [1] | |
| | **(c)** | **(i)** pH 4; | | [1] | |
| | | **(ii)** Use smaller pH intervals (between pH 3 and pH 5) during experiment; | | [1] | |
| | | **(iii)** 0.5 ÷ 40; [1]<br>= 0.0125 g $min^{-1}$; [1] | | [2] | |
| | | **(iv)** Any **two** from:<br>Enzyme denatured;<br>by acid conditions;<br>Active site altered/substrate no longer fits active site; | | [2] | 10 |

| | | | | AVAILABLE MARKS |
|---|---|---|---|---|
| 12 | **(a)** | *Organ A* – Pancreas; [1]<br>*Organ B* – Liver; [1]<br>*Storage product C* – glycogen; [1]<br>*Process D* – Respiration; [1] | [4] | |
| | **(b)** | Starch is **digested** into glucose and **absorbed** into blood; | [1] | |
| | **(c)** | Exercise/miss a meal; | [1] | |
| | **(d)** | Blood glucose concentration constantly **monitored/detected**;<br>Increase in blood glucose causes increase in **insulin** produced;<br>Insulin removes glucose from blood/causes liver to store glycogen/ increased respiration (by body cells);<br>Blood glucose concentration returned to normal/lowered; | [4] | |
| | **(e)** | **Indicative content:**<br><br>**(Before meal/0–2 hours)**<br>1. Glucose normal so insulin low/glucagon high/glucagon falling;<br>2. **Data mark:** insulin 20/glucagon 116–110/glucose 90;<br><br>**(After meal/2–4 hours)**<br>3. As glucose rises, insulin rises and glucagon falls;<br>4. **Data mark:** glucose 150/insulin 120/glucagon falling towards 88(/82);<br><br>**(4–8 hours)**<br>5. Insulin causes the glucose to fall;<br>6. (As glucose falls) glucagon rises (and insulin falls);<br>7. Glucagon causes glucose to rise/level off/stops it falling/keeps it constant;<br>8. Glucagon converts glycogen to glucose; | | |

| Response | Marks |
|---|---|
| Candidates **must use appropriate, specialist terms** throughout to describe how insulin and glucagon work together **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 use **some appropriate, specialist terms** throughout to describe how insulin and glucagon work together **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 to describe how insulin and glucagon work together **using some or all 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] 16

**Total** **100**