Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
January 2014

Biology

Assessment Unit AS 2

assessing

Organisms and Biodiversity

[AB121]

TUESDAY 14 JANUARY, 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.

/ denotes alternative points
; denotes separate points
Comments on mark values are given in bold
Comments on marking points are given in italic

Section A

1 Protoctista;
Prokaryotae;
[first two points in either order]
eukaryotes;
chitin;
autotrophic/photosynthetic; [5] 5

2 **(a)** **(i)** The affinity for oxygen is reduced/oxygen is more easily released; [1]

(ii) Carbon dioxide levels will be increased; [1]

(iii) Temperature rise; [1]

(b) **(i)** Steeper curve to the left of the existing line, with high plateau reached at lower partial pressure of oxygen; [1]

(ii) **Any two from**
- myoglobin acts as oxygen reserve
- partial pressure of oxygen in diving mammals tissue is lower (than terrestrial mammals)
- aerobic respiration is prolonged/onset of anaerobic respiration is delayed [2] 6

3 **(a)** Letter S clearly indicating either top or bottom broken cell wall;
arrows pointing up and down the phloem sieve tube element
[must have clear indication of bi-directional flow]; [2]

(b) **(i)** Sucrose; [1]

(ii) Nitrates are transported in xylem/nitrates have all been used up (to make amino acids); [1] 4

4 **(a)** **(i)** Ventricular systole/contraction; [1]

(ii) Effect: to prevent backflow of blood into ventricles;
0.4 seconds; [2]

(iii) Maximum pressure in the right ventricle would be less;
since the right ventricle has thinner walls/does not pump the blood as far; [2]

(b) **(i)** Evidence in favour: Ireland has a higher intake of fat than Georgia/ Azerbaijan and also a higher percentage of deaths from CHD or converse (Georgia/Azerbaijan has a lower intake of fat than Ireland and a lower percentage of deaths from CHD);
Evidence against: France has the highest fat consumption but the lowest level of deaths from CHD; [2]

(ii) Only certain types of fat/saturated fats/cholesterol have been linked to CHD; [1] 8

5 **(a)** **(i)** Area of Special Scientific Interest; [1]

(ii) 1447770 ÷ (2505 × 2504);
0.23;
[2 marks for correct answer] [2]

(b) **(i)** The biodiversity of the two bogs is very similar/biodiversity is slightly higher in Co. Down bog **[answer consequent to answer in (a)(ii)]**;
Co. Armagh bog is undisturbed by human activity/is also an ASSI/is environmentally protected; [2]

(ii) Species diversity is a measurement of the range of different species present;
genetic diversity is the diversity of DNA (genes) within a species/ population; [2]

(c) Their DNA base sequences would be similar;
the amino acid sequence/primary structure of their proteins would be similar; [2]

(d) **Any three from**
- there would be a lack of oxygen in bogland/waterlogged soils
- passage of oxygen to roots facilitates respiration
- to enable ATP production/energy release
- to enable active uptake/uptake of minerals (ions)
- to facilitate buoyancy (when bog is flooded) [3] 12

6 **(a)** Caption (the effect of light intensity on the rate of carbon dioxide uptake in two plants);
independent variable (light intensity) on x-axis and appropriate scaling;
label on each axis, with appropriate units;
accurate plotting of points, and straight lines drawn with correct labels/key to differentiate A from B; [4]

(b) Value of light intensity: 160;
most growth at lowest cost (for lighting); [2]

(c) Compensation point;
when the rate of photosynthesis is equivalent to the rate of respiration; [2]

(d) **(i)** Species A has a low compensation point;
therefore photosynthesis exceeds respiration at low light intensities; [2]

(ii) **Any three from**
- ancestral population of species A had variation in chloroplast size
- individuals with large chloroplasts were at an advantage/grew better
- in low light environments
- large chloroplast variant passed on its genes
- subsequent generations had large chloroplasts [3] 13

7 **(a)** Thin body shape;
provides short diffusion distance for gases;
or
large surface area to volume ratio;
increases supply of oxygen relative to the volume of tissue using it; [2]

(b) **(i)** Males require more oxygen than females for flight/greater activity;
higher pore density is needed to compensate for their smaller body surface area; [2]

(ii) Males have a smaller volume than females;
they have less tissue to be supplied with oxygen; [2]

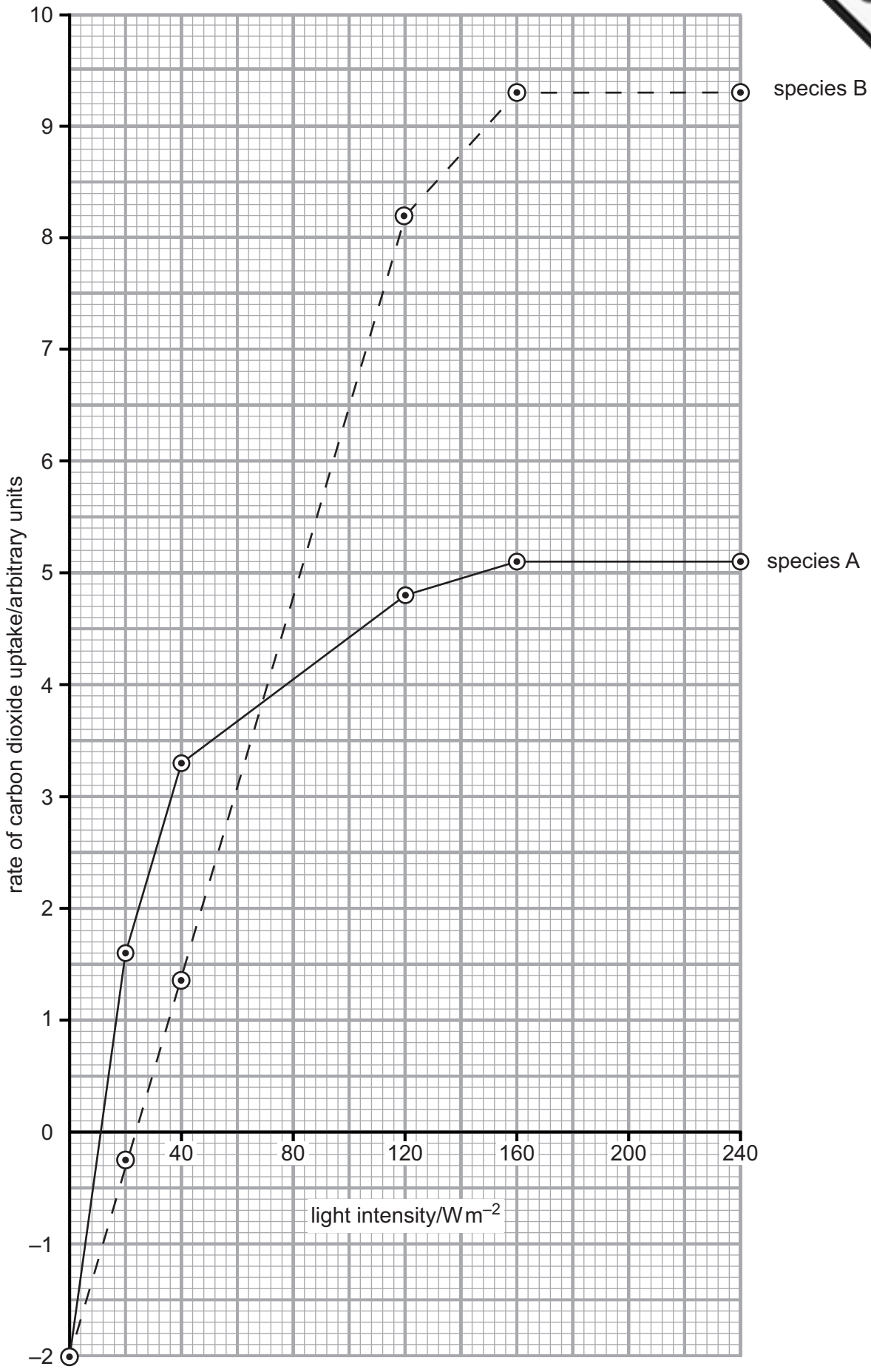
(c) This is the site of gas exchange;
in order to pass from the atmosphere into tissue, gases must be dissolved/in solution; [2]

(d) **Any three from**
- potassium hydroxide absorbs CO_2
- oxygen used up will cause fluid to move towards tube A
- measure the rise in coloured oil/fluid in the U-tube
- over a set period of time
- use syringe to reset fluid to enable repeat readings

Essential point: divide (mean) rise by time taken [4] 12

Section A **60**

The effect of light intensity on the rate of carbon dioxide uptake in two plants



Section B

8 Any thirteen from

- removal of trees/hedgerows/herbaceous strip at field edge
- removes habitats for plants/wildlife corridors
- reseeding/increased use of monoculture
- reduces variety of plant species present in fields
- increased use of (animal) pesticides
- may remove natural predators/non-pest species
- increased use of herbicides
- kills some plant species
- increased use of artificial/nitrogenous fertiliser
- promotes growth of certain plants/causes some plants to be outcompeted
- drainage of wetland/filling in ditches(ponds)
- removes habitat for wetland plants/animals(or by example)
- increased use of slurry
- kills soil organisms
- high stocking rates
- damages hedgerows/overgrazes pasture/favours grass species
- decline of plants *[by any of the above means]* results in less food for animals
- early cropping of grass (for silage)
- removes nesting sites for ground-nesting birds
- other appropriate response [13]

Quality of written communication

2 marks:
The candidate expresses ideas clearly and fluently through well-linked sentences, which present relationships and not merely list features. Points are generally relevant and well-structured. There are few errors of grammar, punctuation and spelling.

1 mark:
The candidate expresses ideas clearly, if not always fluently. The account may stray from the point or may not indicate relationships. There are some errors of grammar, punctuation and spelling.

0 marks:
The candidate produces an account that is of doubtful relevance or obscurely presented with little evidence of linking ideas. Errors in grammar, punctuation and spelling are sufficiently intrusive to disrupt the understanding of the account. [2] 15

Section B **15**

Total **75**