New Specification

Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2017

Biology

Assessment Unit AS 3

assessing

Practical Skills in AS Biology

[SBY31]

FRIDAY 5 MAY, 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.

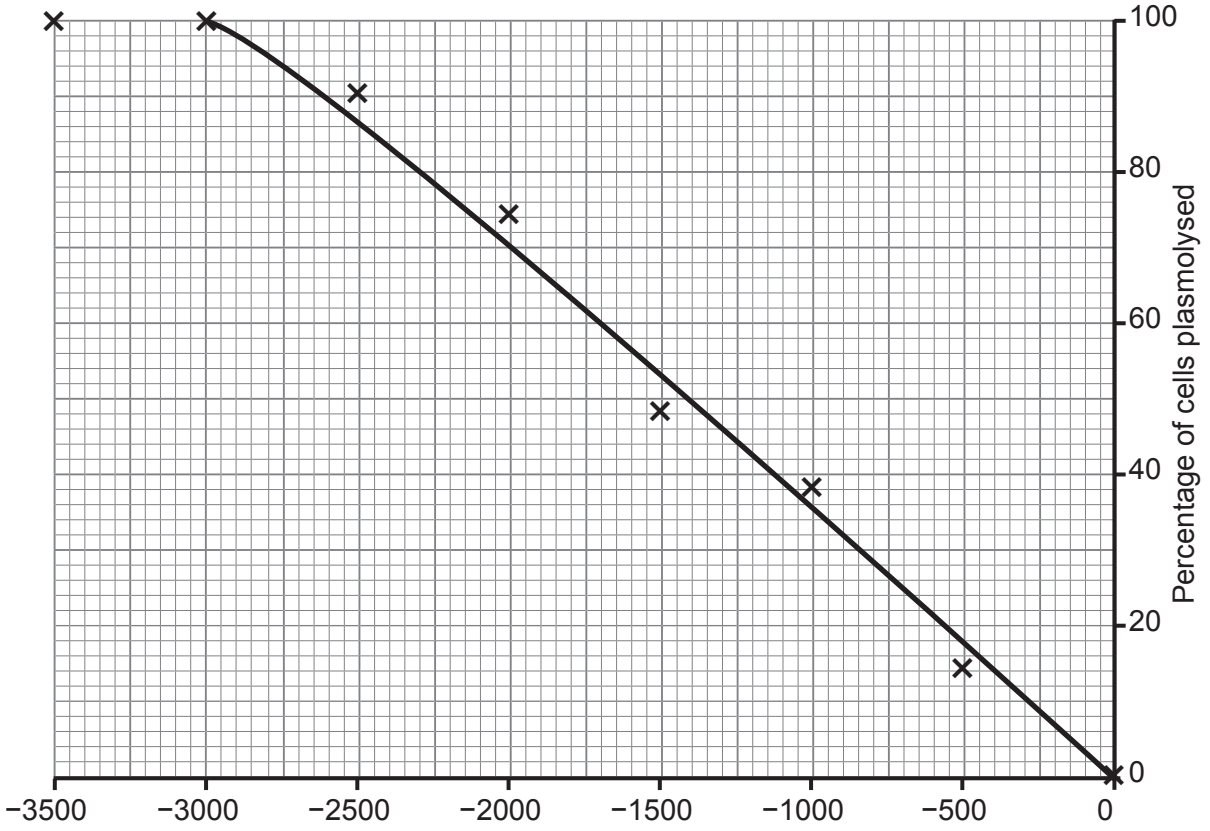
The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed 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)**		Add Benedict's reagent to sample and heat;	[1]	
	(b)		Brick red precipitate;	[1]	
	(c)		Clinistix;	[1]	3
2	**(a)**	**(i)**	Add 1 cm^3 of 1% starch solution to 9 cm^3 distilled water;	[1]	
		(ii)	Any **two** from: • ensure the starch suspension is thoroughly mixed • ensure clean pipette/syringe is used • ensure a pipette/syringe of appropriate precision is used	[2]	
	(b)		Record % transmission/absorbance for each starch concentration; plot a graph of % transmission/absorbance against starch concentration;	[2]	5
3	**(a)**	**(i)**	There is gradation/zonation (of conditions) up the shore/ an environmental gradient exists/area to be sampled is not homogenous;	[1]	
		(ii)	Rock pools are not representative/atypical of position on shore;	[1]	
	(b)	**(i)**	**Similarity** – in both shores *A. nodosum* extends across mid-tidal zone only/from 10–33 m; **Differences** – in the sheltered shore *A. nodosum* is more abundant/has higher % cover (or converse); in the sheltered shore the distribution of *A. nodosum* is less patchy;	[3]	
		(ii)	Waves dislodge *A. nodosum* from rocks in exposed shores/cannot get established on exposed shore;	[1]	6

4 **(a)** Need to count/record the total number of cells sampled (not just plasmolysed cells); [1]

(b) All points correctly plotted 2 marks;;
one error in plotting = 1 mark;
appropriate best fit line/curve; [3]



(c) Value from graph that shows 50% cells plasmolysed; [1]

5

5 **(a)** Difference in soil mass before and after drying = 24.51 – 14.83;
9.68;

$\frac{9.68}{24.51} \times 100$; = 39.49/39.5%; [3]

(b) Any appropriate answer; need reference to both the edaphic factor and the method; [1]

4

AVAILABLE MARKS

			AVAILABLE MARKS
6	**(a)**	Any **five** from: • description of method of obtaining suitable roots, e.g. grow broad beans in seed tray for 7–14 days/suspend onion over beaker of water • remove (lateral) roots at appropriate stage/when actively growing • description of how to soften/break up tissue, e.g. heating in dilute HCl/ heating in acetic orcein • description of staining chromosomes using, e.g. acetic orcein/toluidine blue • reference to obtaining zone of division, e.g. using only the final mm in root tip • description of need to obtain 'squash'/single layer of cells for observation under the microscope • description of method of squashing, e.g. tapping cover slip with pencil tip [5]	
	(b)	**(i)** Shape correct and includes two sets of chromosomes of proportional size; accurate representation of cell, e.g. chromosomes in telophase, development of cell plate included; three structures correctly labelled = 2;; two structures correctly labelled = 1; [4]	
		(ii) Telophase; [1]	10
7	**(a)**	<table><tr><th>Variable</th><th>Need to be Controlled</th></tr><tr><td>Temperature</td><td>✓</td></tr><tr><td>Concentration of enzyme</td><td></td></tr><tr><td>Concentration of substrate</td><td>✓</td></tr><tr><td>Volume of substrate</td><td>✓</td></tr></table> (all correct = 2;; 1 mistake = 1;) [2]	
	(b)	Appropriate column/row headings, e.g. tissue type, **maximum** height of froth; appropriate units for froth height, e.g. mm/cm (and must not be in body of the table and need solidus); all three tissues included; [3]	
	(c)	Collect the oxygen produced; and measure its volume (e.g. in mm^3); (other appropriate response) [2]	
	(d)	Increase in amount of free enzyme/increased number of enzymes in contact with substrate; [1]	8

				AVAILABLE MARKS
8	(a)	(i)	80 stage micrometer units = 100 eyepiece graticule units; 100 small divisions (s.e.u.) in eyepiece graticule = 80 × 10 µm = 800 µm; 1 s.e.u. = 8 µm; [3]	
		(ii)	Only the stage micrometer will move in and out of focus/eyepiece graticule will rotate by turning eyepiece lens on the microscope/switch to high power and the stage micrometer will be further magnified but the eyepiece graticule will not/other appropriate response; [1]	
	(b)	(i)	Middle lamella/boundary between adjacent cell walls; [1]	
		(ii)	Any **four** from: • select suitable reference point for measuring cell length, e.g. inner edge of cell wall/middle lamella • measure length of cell in small eyepiece units (s.e.u.) • using the most appropriate power (high power if possible) • convert s.e.u. to µm • measure an appropriate number of cell lengths and calculate mean length [4]	9
			Total	**50**