Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2024

Biology

Assessment Unit AS 3

assessing

Practical Skills in AS Biology

[SBY31]

WEDNESDAY 29 MAY, MORNING

MARK SCHEME

General Marking Instructions

Introduction

The main purpose of the mark scheme is to ensure that examinations are marked accurately, consistently and fairly. The mark scheme provides examiners with an indication of the nature and range of candidates' responses likely to be worthy of credit. It also sets out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for Biology.

Candidates should be able to demonstrate:

AO1 Knowledge and understanding of scientific ideas, processes, techniques and procedures.

AO2 Apply knowledge and understanding of scientific ideas, processes, techniques and procedures:

- in a theoretical context
- in a practical context
- when handling qualitative data
- when handling quantitative data.

AO3 Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to:

- make judgements and reach conclusions
- develop and refine practical design and procedures.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 17 or 18-year-old which is the age at which the majority of candidates sit their GCE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 17 or 18-year-old GCE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Marking Calculations

In marking answers involving calculations, examiners should apply the 'own figure rule' so that candidates are not penalised more than once for a computational error. To avoid a candidate being penalised, marks can be awarded where correct conclusions or inferences are made from their incorrect calculations.

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

AVAILABLE MARKS

1 **(a)** **A** – Lymphocyte;
B – Polymorph; [2]

(b) 11 mm × 1000 = 11 000 mm;
÷ 7 = 1571; [2] 4

2 **(a)** Marks for drawing:
Representative of photomicrograph;
Layers proportional;
Block diagram – no sketchy lines/individual cells/shading;

Labels correct: 3 = [2] and 2 = [1] mark
- Upper epidermis
- Palisade mesophyll
- Spongy mesophyll
- Lower epidermis
- Vascular tissue/bundle/xylem [5]

(b) Absence of leaf curl/leaf hairs/sunken stomata/thick cuticle; [1] 6

3 **(a)** **(i)** **A** – (Right) atrium;
B – Aorta/pulmonary artery;
C – Ventricle; [3]

(ii) Coronary artery; [1]

(b) **(i)** Any **pair** from:
- A-V valves; prevent back flow of blood to atria;
- Valve tendons/chordae tendineae; prevent A-V valves opening back into atria;
- Papillary muscle; attach valve tendons to the ventricle wall;
- Septum; separates oxygenated and deoxygenated blood [4]

(ii) Use a dissection board/care taken with scalpels/scissors/gloves worn; [1] 9

				AVAILABLE MARKS
4	**(a)**	Running – any **two** from: • ensure the origin line is above the solvent in tank • allow solvent to run up the paper • remove paper before it runs to the end/mark the solvent front Developing dry the paper; spray the paper with ninhydrin (in a fume cupboard);	[4]	
	(b)	**(i)** Solvent front correctly labelled;	[1]	
		(ii) The mixture contains two amino acids; alanine and lysine;	[2]	
		(iii) Different solvent/paper used/not left to run for sufficient time/ measured top not middle (of spot);	[1]	8
5	**(a)**	There is an environmental gradient (from lower to upper shore);	[1]	
	(b)	**(i)** Lower shore has 2 species or by name/dominant species serrated wrack; Middle shore has 4 species or by name/highest abundance of seaweed; Upper shore has 3 species or by name/dominated by spiral and channelled wrack/channelled wrack only found in upper shore;	[3]	
		(ii) Competition/grazing;	[1]	
		(iii) Not enough seawater/temperature too high; seaweed would dry out/OAR;	[2]	
	(c)	Quadrats; sea snails do not move fast/quickly/won't move outside the quadrat;	[2]	9

					AVAILABLE MARKS
6	(a)	(i)	Starch is larger/heavier than the enzyme;	[1]	
		(ii)	Remains yellow-brown (not blue-black);	[1]	
	(b)	(i)	Red; as the solution will reflect blue/absorbs red light;	[2]	
		(ii)	Fill a cuvette with the sample; only handle cuvette at sides/ensure it is clean/inserted in correct orientation; use a blank of water and iodine to calibrate/standardise the colorimeter; description of how to obtain % transmission;	[4]	
	(c)	(i)	The concentration of starch is increasing; (More starch present), more light absorbed/less light can be transmitted through the solution; More successful collisions/ESC forming;	[3]	
		(ii)	0.32% – 0.34%;	[1]	
		(iii)	The concentration will lower; fewer enzymes, fewer active sites/ESC, so less product;	[2]	14
				Total	**50**