ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2023

Biology

Assessment Unit AS 3

assessing

Practical Skills in AS Biology

[SBY31]

WEDNESDAY 31 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)** **(i)** (Root) tip; [1]

   (ii) Acetic orcein/toluidine blue; [1]

   (iii) Soften the root tissue/halt mitosis;
   single layer of cells; [2]

   (b) Anaphase; [1]   5

2 **(a)** **(i)** Homogenisation; [1]

   (ii) Pestle and mortar/blender; [1]

   (iii) Centrifugation/cell fractionation; [1]

   (b) C;
   they are the heaviest/most dense of the organelles; [2]   5

3 **(a)** Respirometer; [1]

   (b) Chemical X – potassium/sodium hydroxide;
   Precaution – all joints sealed/airtight;
   Any **three** from:
   •   find the mass of the peas
   •   measure the distance the oil moves (towards the living organism)
   •   in a set period of time
   •   divide the distance moved by mass and time [5]   6

4 Drawing is proportional/size correct/placement of grana and thylakoids correct;
   drawing has clean lines;
   accurate biological drawing;
   correct labels; [5]   5

5 **(a)** 1 – Iodine;
   2 – Biuret;
   3 – Benedict's;
   (2 correct = [1], 3 correct = [2]) [2]

   (b) A – Protein;
   B – Starch **and** reducing sugar; [2]

   (c) Glucose reagent strip/Clinistix;
   dip in solution and look for colour change; [2]   6

6 **(a)** 1.2 cm/12 mm;
12000 µm;
÷ 3 = 4000; [3]

(b) A   mitochondria;
B   nuclear envelope;
C   nucleolus;
D   nucleus/chromatin; [4]

(c) Angle of section; [1]   8

7 **(a)**

Sample site	% Cover of each plant			
	Grass	Buttercup	Daisy	Clover
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Independent variable named;
dependent variable named;
four plants included in dependent variable column;
logical construction/appropriate column headings; [4]

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

(ii) Random;
to avoid bias/ensure a representative sample;
the area is uniform/has no environmental gradient; [3]

(iii) Divide the area to be sampled into a grid/by description;
generate coordinates using random numbers; [2]

(c) Increase the number of sample sites; [1]

(d) Essential point - Biodiversity is greater in A/less in B;
Any **two** from:
• grass is most common in both fields
• A has more buttercup and clover than B
• daisy is almost the same in each field
• B is dominated by grass/A more even spread of plant species [3]

(e) Grazing/farming practice/OAR; [1]   15

Total   **50**