



**ADVANCED SUBSIDIARY (AS)
General Certificate of Education**

Biology

Assessment Unit AS 3

assessing

Practical Skills in AS Biology

[SBY31]

Assessment

MARK SCHEME

General Marking Instructions

The main purpose of the mark scheme is to ensure that each question is marked accurately, consistently and fairly.

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which students may produce. In the event of unanticipated answers, teachers and lecturers are expected to use their professional judgement to assess the validity of answers.

Mark Scheme Notation

The use of a solidus (/) denotes alternative answers which can be awarded within the same question (or marking point in a question worth more than one mark).

The use of a semi-colon (;) denotes separate marking points. These are particularly relevant when separating the different marking points in a question worth more than one mark.

Part of an answer within brackets indicates that this part is not essential to gain credit – the bracketed section is usually to set context or for the purpose of completeness.

Some answers are shown as 'Any **two** from' (or any number between two and six). This means that any two (or other specified number) answers from the bullet-pointed list can be credited in this question or question part.

Some answers have 'Other appropriate response' (OAR) as an alternative answer which may be credited. OAR is most likely to appear in an answer where there are a wide range of possible answers worthy of credit and it is unlikely that the mark scheme contains all the possible answers.

Marking Calculations

Full marks are normally awarded for the correct answer – irrespective of whether working out has been shown (even when asked to show working out.) The principle of 'error carried forward' (ECF) usually applies in that if a student makes a mistake in the first part of a three-mark, three-stage calculation then the final two marks can be awarded if the second and third stage processes are carried out correctly. The same principle applies to a mistake at any stage in a calculation.

Essays

The mark scheme includes indicative points for essays. Each indicative point is numbered to aid marking. Following the indicative points in the mark scheme, a table is included which shows how many marks should be awarded for an answer that is credited with having a particular number of indicative points.

Additional Guidance

The Additional Guidance column in the mark scheme provides extra information to aid the marking process. This column includes clarification concerning some marking points: this may include naming key words which may be required in an answer or may provide a range of alternative answers which would be considered creditworthy under OAR, or examples of the ECF principle. It may also include examples of answers which would not be considered creditworthy.

Question	Answer	Additional Guidance	Mark
1	Chemical/solution	Allow methylene blue.	
	Iodine/other appropriate response;		
	Buffer;		
	Acetic orcein/toluidine blue;		
	Potassium hydroxide/KOH/ sodium hydroxide/NaOH/ soda lime;		
			[4] [4]

2 (a) (i)	A – Solvent front; B – Origin/baseline;	A – allow distance solvent has moved.	[2]
(ii)	Any two from: • use a pencil • a line that is a suitable distance from the bottom of the paper • wear gloves	Bullet point (bp) 1 reject do not use a pen (not enough). (bp3) allow only handle paper by the edges.	[2]
(b)	44 ÷ 80 mm; 0.55;	Responses gaining 1 mark (provided working out is shown): 1.8 (arrived at by dividing 80 by 40), 0.6 (arrived at by taking both measurements from bottom of page, 54/90). Correct answer of 0.55 gains 2 marks, even if no working out shown.	[2]
(c)	Alanine;		[1] [7]

3 (a)	A – transport of oxygen; B – transport of glucose/urea/amino acids/ carbon dioxide/ hormones/ antibodies/ heat; C – engulf and digest microorganisms/ phagocytosis;	A – allow to <i>supply</i> the tissues with oxygen but not just <i>combines</i> with oxygen. O ₂ and CO ₂ fine for oxygen and carbon dioxide. B – any of alternatives can be credited (applies throughout when / used). C – allow engulf or digest microbes or are phagocytes.	[3]
(b)	Y; thicker/more muscular walls; smaller lumen;	(MP3) not just artery is smaller in TS.	[3]

Question	Answer	Additional Guidance	Mark
(c)	Any three from: <ul style="list-style-type: none"> • use a scalpel/scissors on a dissection board/tray • cut through the ventral/front wall • from the atrium to the base of the ventricle • pull the two sides apart to expose the two heart chambers 	(bp1) need both cutting implement and support.	[3] [9]

4	Any four from: <ul style="list-style-type: none"> • pour each type of milk into syringe in turn • appropriate controlled variable • colour with Benedict's reagent/ glucose test strips • decision on which result has highest amount of glucose • second controlled variable 	If procedure described for one type of milk and then states that it should be repeated for the other type of milk allow bp1. (bps 2 and 5) examples include: use same volume of milk/milk at same temperature/pour through syringe the same number of times, but not use same number of beads/ apparatus as this is stated in the question. (bp4) milk with most lactose will be milk with most glucose upon testing or the milk which tests positive with fewer times through the syringe.	[4] [4]
---	---	--	---------

5 (a)	To ensure all the cells are turgid (at the start of the experiment);		[1]
(b)	Left (column) heading – Concentration of sucrose (solution)/ mol dm ⁻³ ; Right heading – Percentage of cells plasmolysed;	Left heading – need both sucrose concentration and units. Allow molarity of sucrose. Right heading – percentage plasmolysed not enough (need cells).	[2]
(c)	Plot a graph of (mean) percentage plasmolysis against sucrose concentration; draw an appropriate line of best fit; use 50% plasmolysis to determine the point of incipient plasmolysis;	(MP1) not graph of sucrose concentration against percentage plasmolysis. (MP2) must be a best fit line and not point to point.	[3] [6]

6 (a) (i)	A – vacuole; B – granum/thylakoids; C – stroma;		[3]
(ii)	D labelling cell wall;		[1]
(b) (i)	Transmission electron microscope;	Allow TEM but not just electron microscope.	[1]

Question	Answer	Additional Guidance	Mark
(ii)	15 mm × 1000 = 15 000 μm; 15 000 ÷ 0.6 = 25 000;	(MP1) allow between 15 – 15.5 mm for scale bar measurement. Correct answer (i.e. between 25 000 and 25 833) without working out = 2 marks.	[2]
(c) (i)	Starch;	Allow amylose/amylopectin.	[1]
(ii)	Iodine – yellow/brown to blue/black;	Allow red, yellow, orange, brown in any combination except brown on its own. Before and after needed.	[1] [9]

7 (a)	Quadrat;		[1]
(b) (i)	Grazed areas greater cover than un-grazed areas; grazed areas have higher % grass cover; grazed areas have lower % moss cover;	Allow more bare ground as alternative to first marking point. Reference to number of plant species neutral (i.e. no mark awarded but not penalised either). Allow converse throughout.	[3]
(ii)	Any two from: <ul style="list-style-type: none"> grazing animals carry in seeds on their bodies/in their faeces grazing animals fertilise/enrich the soil via faeces and urine grazing animals clear sections of woodland and increase the light available to the ground layer grazing reduces the effect of dominant plants (allowing more species) 	Grazing encourages development of low-growing species – allow as alternative to either bp3 or bp4.	[2]
(c)	Any three from: <ul style="list-style-type: none"> mass of container mass of container and soil dry to a constant mass description of calculation of mass change/% mass change 	'Weigh container then container plus soil' = bp1 and bp2. (bp3) dry soil overnight/for 24 hours in an incubator/oven implies drying to a constant mass.	[3]
(d)	Surveyed a large number of areas; with approximately the same number of grazed and un-grazed;	Credit answers implied through quoting numbers, e.g. 1 mark for 98 areas surveyed. 52 grazed areas and 46 un-grazed surveyed worth 1 but not 2 marks.	[2] [11]
		Total	[50]