

Subject: Biology Practical Examination Code: 2806/03

Session: January Year: 2002

Mark Scheme

MAXIMUM MARK	60
---------------------	-----------

ADVICE TO EXAMINERS ON THE ANNOTATION OF SCRIPTS

1. Please ensure that you use the **final** version of the Mark Scheme.
You are advised to destroy all draft versions.
2. Please mark all post-standardisation scripts in red ink. A tick (✓) should be used for each answer judged worthy of a mark. Ticks should be placed as close as possible to the point in the answer where the mark has been awarded. The number of ticks should be the same as the number of marks awarded. If two or more responses are required for one mark, use only one tick. Half marks ($\frac{1}{2}$) should never be used.
3. The following annotations may be used when marking. No comments should be written on scripts unless they relate directly to the mark scheme. Remember that scripts may be returned to Centres.

x = incorrect response errors may also be underlined
^ = omission mark
bod = benefit of the doubt where professional judgement has been used
ecf = error carried forward in consequential marking
con = contradiction in cases where candidates contradict themselves in the same response
sf = error in the number of significant figures
4. The marks awarded for each part question should be indicated in the margin provided on the right hand side of the page. The mark total for each question should be ringed at the end of the question, on the right hand side. These totals should be added up to give the final total on the front of the paper.
5. In cases where candidates are required to give a specific number of answers, e.g. 'give three reasons', mark the first answers given up to the total number required. Strike through the remainder. In specific cases where this rule cannot be applied, the exact procedure to be used is given in the mark scheme.
6. Correct answers to calculations should gain full credit even if no working is shown, unless otherwise indicated in the mark scheme. An instruction on the paper to 'Show your working' is to help candidates, who may then gain partial credit even if their final answer is not correct.
7. Strike through all blank spaces and/or pages in order to give a clear indication that the whole of the script has been considered.
8. An element of professional judgement is required in the marking of any written paper, and candidates may not use the exact words that appear in the mark scheme. If the science is correct and answers the question, then the marks should normally be credited. If you are in doubt about the validity of any answer, contact your Team Leader/Principal Examiner for guidance.

Mark Scheme Page 3 of 6	Unit Code 2803/03	Session January	Year 2002	Version Final
-----------------------------------	------------------------------------	---------------------------	---------------------	-------------------------

Planning Exercise

The mark scheme for the planning exercise is set out on page 4. The marking points **A** to **T** follow the coursework descriptors for Skill P.

Indicate on the plans where the marking points are met by using a tick and an appropriate letter. There are 14 marking points for aspects of the plan and two marks for quality of written communication (QWC).

Practical Test

Pages 5 and 6 have the mark scheme for Questions 1 and 2 for the Practical Test.

Mark Scheme Page 4 of 6	Unit Code 2803/03	Session January	Year 2002	Version Final
-----------------------------------	------------------------------------	---------------------------	---------------------	-------------------------

AS Biology. Planning exercise.

Checking Point	Descriptor	The candidate
A	P.1a	Plans a suitable procedure that involves evacuating leaf discs
B	P.1a	Gives a prediction about the compensation point, maybe in the form of a graph
C	P.1b	Selects suitable equipment and materials – to include apparatus for illuminating discs and measuring light intensity (although could be $1/d^2$)
D	P.3a	Develops a strategy to find effect of different light intensities on leaf discs b
E	P.3a	Identifies a key factor to control e.g. temperature; age of leaves
F	P.3a	Explains compensation point in terms of photosynthesis and respiration within leaf tissue
G	P.3b	Decides on appropriate number of measurements to take: e.g. minimum of four different light intensities, all fairly low (= range)
H	P.5a	Uses appropriate (A2) scientific knowledge and understanding in developing a plan, e.g. ref to light independent stage, photolysis of water
I	P.5a	Uses results from preliminary work, previous practical work or identified secondary source in developing a plan
J	P.5a	Includes appropriate precautions in strategy, e.g. keeps discs in dark after cutting, uses fresh solution each time
K	P.5a	Refers to a safety aspect (look for a statement about safety - a risk assessment is best)
L*	P.5b	Gives a clear account, logically presented with accurate use of scientific vocabulary (QWC)
M	P.5b	Describes way(s) of obtaining precise results e.g. timing leaf discs to float / move up from base of container
N	P.5b	Describes ways of obtaining reliable results by including replicates and calculating means
O	P.7a	Uses information from at least two identified sources , e.g. preliminary work / class practical and a text book / web site etc
P	P.7a	Shows how data is to be presented in form of a table / graph
Q	P.7a	Links plan throughout to scientific knowledge and understanding using appropriate information e.g. leaf structure, temperature and enzymes
R*	P.7a	Uses spelling, punctuation and grammar accurately (QWC)
S	P.7b	Explains how data would be interpreted to find answer to the investigation
T	P.7b	Comments on precision and/or reliability e.g. variability in behaviour of discs, careful choice of discs

Point mark up to **14** by placing letters (A to T **excluding L and R**) in the margin at appropriate points. Then award **1** mark for each of L and R (QWC).

Total: 16

Mark Scheme Page 5 of 6	Unit Code 2803/03	Session January	Year 2002	Version Final
-----------------------------------	------------------------------------	---------------------------	---------------------	-------------------------

Question	Expected Answers	Marks
1 (a) (i)	colour change from blue to green recorded; time recorded;	2
(ii)	tube details;; observed for at least the same time period; result stated; explanation given;	5
(b)	method given for dark tube; appropriate time period; results in both;; light needed; probable enzyme / membrane protein involvement; because denaturation is indicated;	max 5
(c)	length of time period involved; concentrations of reactants the same;	2
(d)	reduction of DCPIP takes place; by hydrogen ions (or equivalent); generated in the light; by chloroplasts; enzyme controlled / membrane located;	max 4
(e)	6.5 is near the optimum for the enzymes (etc) concerned; sucrose avoids osmotic disruption of the chloroplasts;	2
(f)	concentration of DCPIP; chloroplast density of extract; temperature; presence of activators / inhibitors;	max 2
(g) (i)	check that no further colour change occurs; method given e.g. colorimeter or reference to a green colour standard;	2
(ii)	increasing rate of reduction with increasing light intensity; due to greater liberation of electrons (hydrogen ions etc); light intensity becomes limiting; at 800-1000 lux; 1200 reading seems to be anomalous; possible heating effect / light damage to chloroplasts;	5
[Total:		29]

Mark Scheme Page 6 of 6	Unit Code 2803/03	Session January	Year 2002	Version Final
-----------------------------------	------------------------------------	---------------------------	---------------------	-------------------------

Question	Expected Answers	Marks
2 (a)	(i) <i>drawings</i> tubule shown in TS; and 'sausage-shape'; at least one tubule shown as hollow;	3
	(ii) from cortex to pelvis;	1
	(iii) loop of Henle;	1
	(iv) ref to lumen size / wall thickness; all run in same direction in C;	2
	(v) Malpighian bodies / glomeruli / Bowman's capsules / AW;	1
(b)	(i) two-layered; egg-shaped; all central tubes cut in TS;	max 2
	(ii) circular outline; detail of a nucleus; 3-5 nuclei shown; ratio of lumen to wall (2 :1); relative size of nucleus compared to wall;	5
		[Total: 15]

.....