



RECOGNISING ACHIEVEMENT

JANUARY 2003

ADVANCED SUBSIDIARY GCE UNIT

MARK SCHEME

MAXIMUM MARK: 45

Syllabus / Component: 2803/01

Biology: Transport

Paper Set Date: 15/01/03

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 answer(s) 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 mark(s) should normally be credited. If you are in doubt about the validity of any answer, contact your Team Leader/Principal Examiner for guidance.

Abbreviations, annotations and conventions used in the Mark Scheme	/	= alternative and acceptable answers for the same marking point
	;	= separates marking points
	NOT	= answers which are not worthy of credit
	()	= words which are not essential to gain credit
	—	= (underlining) key words which must be used to gain credit
	ecf	= error carried forward
	AW	= alternative wording
	A	= accept
	R	= reject
	ora	= or reverse argument

Question	Expected Answers	Marks
1 (a) (i)	(field) mouse;	1
(ii)	many cell (layers); A 3 cell layers cells deep in the body / diffusion too slow / AW; (more metabolically) active / AW; surface area to volume (ratio) low / lowest (of the three) <i>ora</i> large vol:SA; <i>apply ora if answered in terms of other organisms</i> R size unqualified	2 max
(b)	oxygen; A oxygenated blood carbon dioxide; urea / creatinine; R urine hormones / named hormone; vitamins / named vitamin; ions / minerals / named ion / named mineral / salts; sugars / monosaccharides / named monosaccharide; R carbohydrates / sucrose fatty acids / glycerol / lipids / monoglycerides; amino acids / antibodies / proteins / named protein; R if dietary protein implied lactate / lactic acid; water; <i>accept 3 named hormones/vitamins / minerals etc.</i> <i>accept 'respiratory gases' for 1 mark</i>	3 max

[Total: 6]

Question	Expected Answers	Marks
2 (a)	A = xylem / xylem, vessel(s) / tube / element / lumen of xylem (vessel); B = guard cell(s); C = phloem / sieve tube(s) / sieve plate(s) / sieve elements;	3
(b)	stomata are open (during the day); <i>must state / imply open stomata</i> to allow gas exchange / AW; A one named gas exchanged large (moist) surface area of (spongy) mesophyll / large leaf area; ref diffusion / (water potential) gradient;	2 max
(c) (i)	temperature; (warmer) gives more evaporation / saturation capacity of air higher / ref to (kinetic) energy / AW; humidity; diffusion gradient steeper in low humidity / AW; air movement / wind; boundary layer / diffusion shells / AW, blown away in windier conditions; light; ref to effect on stomatal aperture i.e. open in light; credit ref to different temp effects (on day 1 and 2) regarding stomatal opening or closing;; credit ref to very high wind causing stomatal closure;; <i>apply ora as appropriate</i> <i>one mark for factor and one for explanation in each case. Look for factor in explanation if not clear in first line and credit it there</i>	4 max

- (ii) 1 use a potometer (uptake);
 2 take a (suitable) shoot of the plant / AW;
 3 set up, under water / avoiding airlocks / cut under water / AW;
 4 all (joints) air tight / seal / AW;
 5 simulate / AW, a stated condition / day 1 / AW;
 6 further detail; e.g. a second condition
 or detail of how condition achieved
 or simulate / AW day 2
 7 allow time to acclimatise;
 8 record movement for a set time / note start to end / AW;
 9 repeat several times;
 10 calculate a mean;
 11 convert (linear measures) to mass; **A** via volumes where appropriate
 12 per given, unit time / unit area;
 13 AVP; e.g. cut stem at angle / use fully turgid material / similar size
 or type / dry leaves or remove grease

credit information from a suitably labelled diagram
credit equivalent points for another suitable method e.g. a mass potometer

mass potometer

- 1 (mass) potometer;
 2 take shoot / whole plant;
 3 idea that all but plant covered to stop transpiration;
 4 other detail of set up / apparatus;
 5-13 as above - credit ref to sensitivity of balance

'condensation method'

- 1-4 *no marks*
 5-13 as above where possible

6 max

QWC legible text with accurate spelling, punctuation and grammar

1

[Total: 16]

Question	Expected Answers	Marks
3 (a)	separation of oxygenated and deoxygenated blood; <i>credit once in (i) or (ii)</i>	
(i)	blood flows twice through heart; per one full circulation / AW; pulmonary (circulation) / to lungs; systemic (circulation) / to the body / AW; R systematic	2 max
(ii)	more oxygen reaches tissues <i>or</i> cells / more efficient supply to tissues <i>or</i> cells; helps (sustain) high blood pressure / AW; less resistance to flow; easier to return blood to heart; more rapid circulation; greater activity possible; too high a pressure does not damage lungs;	1 max
(b)	C; R; D; U; E; T;	6
		[Total: 9]

Question	Expected Answers	Marks
4	companion; sieve plates; sucrose; sinks; active / uses energy; R alive or metabolic unqualified	5
		[Total: 5]

Question	Expected Answers	Marks
5 (a) (i)	Y;	1
(ii)	thin(ner) wall; thin(ner) tunica media / middle layer / coat; less / AW, muscle / elastic tissue (in tunica media); wide® lumen / AW; ref to shape qualified; not, 'crinkly' tunica intima / inner layer; A suitable alternative <i>apply ora for X</i>	2 max
(b) (i)	18.5 – 15.5 = 3 (kPa);;	
	<i>award the calculation mark if both systolic pressures are correct but subtraction is wrong or if one of the systolic pressures within J is read incorrectly, but the subtraction is correct</i>	
	<i>if diastolic pressures used, no mark</i>	
	<i>no marks if pressures outside J are used</i>	2
(ii)	N; R ranges like M-N	1
(c)	action of, skeletal / surrounding / AW muscle; R muscle unqualified valves; stop backflow / AW; low pressure in thorax; AVP; e.g. action of heart / enters right or left atrium / named vein / residual pressure in vein	3 max
		[Total: 9]