



Subject: Transport Code: 2803/01

Session: June Year: 2002

Mark Scheme

MAXIMUM MARK	45
---------------------	-----------

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
	R	= reject
	()	= words which are not essential to gain credit
	_____	= (underlining) key words which must be used to gain credit
	ecf	= error carried forward
	A	= accept
	AW	= alternative wording
	ora	= or reverse argument

Question	Expected Answers	Marks
1 (a) (i)	one mark for each correctly shown/labelled; ; ; ; ;	5
(ii)	cytoplasm in companion cell; (<i>treat presence in sieve tube as neutral</i>) nucleus only in companion cell and only one shown;	2
(b)	source = where (material) made / stored / loaded (into phloem) + suitable e.g.; A photosynthesis for made sink = where (material) used / respired / stored / unloaded (from phloem) + suitable e.g.; (<i>look for definition plus eg. N.B. storage organs are both source and sink</i>) (<i>max 1 for two correct definitions with no e.g. or two correct examples with no definition</i>) R refs to water or minerals	2
(c)	sucrose;	1
(d) (i)	(needs) energy / ATP / respiration involved / AW;	1
(ii)	ATP present; temperature dependent; oxygen dependent; slowed by (metabolic) inhibitors; ref to speed qualified e.g. faster than diffusion etc; ref to bidirectional flow / AW; many mitochondria / AW; AVP; e.g. correct ref to H ⁺ / pH / K ⁺ / phosphate e.g. loading is against a concentration gradient / AW	2 max

[Total: 13]

Question	Expected Answers	Marks
2 (a)	<p>haemoglobin to carry oxygen; no, nucleus / no or few cell organelles / named e.g so, more haemoglobin / more oxygen; large surface area for (increased) gas uptake / exchange / AW; small size / thin cell / AW gives, short diffusion path within the cell / faster diffusion; R easier size just fits capillaries, so slowed for max exchange / close to cells / tissues (for exchange); elastic membrane allows them to squeeze through capillaries / AW; ref to carbonic anhydrase;</p>	3 max
(b)	<p>1 at pO_2 in lungs / at high pO_2, O_2 picked up / haemoglobin stays saturated / AW; 2 tissues have lower pO_2; 3 oxyhaemoglobin dissociates / AW; 4 (and) O_2 diffuses / AW to tissues; 5 ref steepest part of curve corresponding to pO_2 of tissues; 6 small drop in pO_2 gives a large drop in saturation of haemoglobin / AW; 7 use of figures from the steep area e.g. pO_2 2 – 5 kPa to support this;</p>	3 max
(c)	22 (%); A 22-23 inc.	1
(d)	<p>pO_2 in placenta low / same in fetus and mother; maternal oxyhaemoglobin, gives up oxygen / dissociates / AW; oxygen diffuses / AW, across the placenta / to fetus / AW; fetal haemoglobin, picks up O_2 / has a higher affinity / AW; ref to oxygen needed by fetus for respiration / energy release / AW; R energy production</p>	3 max

(e)

*structure (max 3)**tunica intima / AW*

S 1 endothelium;

S 2 squamous / pavement epithelial cells;

S 3 (some) elastic (tissue); *treat muscle or collagen as neutral, but reject**S3 if both mentioned in the t. intima**tunica media / AW*

S 4 (much) muscle;

S 5 elastic (tissue) / collagen;

tunica externa / AW

S 6 collagen / connective tissue; R if muscle included. Elastic neutral

Accept the elastic mark if given in general

S 7 narrow lumen / AW;

S 8 ref elastic nature of aorta / main arteries;

*(marks can be gained from a well labelled diagram)**relation to function (max 3)*

F 1 smooth endothelium helps flow / AW;

F 2 narrow lumen maintains pressure;

F 3 (thick) muscle / collagen / AW, stops rupture / AW;

F 4 elastic (tissue) allows 'give' / AW;

F 5 ref to role of elastic recoil in moving blood;

F 6 ref to elasticity smoothing out pulsatile flow / reducing pressure;

F 7 ref to vasoconstriction / dilation of muscle with suitable e.g.;

R strong / thick unqualified

6 max**QWC – clear, well organised using specialist terms****1****[Total: 17]**

Question	Expected Answers	Marks
3 (a) (i)	correct label (anywhere on the cell);	1
(ii)	(apoplast pathway) via cell walls (in pathway 3); (symplast pathway) via cytoplasm (in pathway 2); via the vacuoles (in pathway 1); ref to <u>down water potential</u> gradients / from high to low <u>water potential</u> ; ref to osmosis; ref to common pathway(s) qualified; <i>treat apoplast / symplast as neutral throughout</i> <i>penalise only once if descriptions of pathways fail to match key</i>	3 max
		[Total: 4]

Question	Expected Answers	Marks
4 (a)	70 (allow 60 – 80 or any single figure or range within); R if any part of a range is out side 60 - 90 myogenic; <i>treat involuntary as neutral</i> right; SAN / sino atrial node / pacemaker; AVN / atrio ventricular node; Purkyne fibres / (bundle of) His; (<i>A Purkinje</i>) contract;	
	<i>reject arterio etc. once if used in SAN or AVN answers</i>	7
(b) (i)	blood enclosed in vessels / AW; <i>If vessels named, must have two</i>	1
(ii)	1 twice through heart; 2 for complete body circuit / AW; 3 ref to pulmonary / described to and from lungs ; 4 and systemic systems / described to and from body; 5 separation of, oxygenated and deoxygenated blood / left and right side (of heart) / two sides / AW; <i>points 1 and 2 need to be stated not just implied</i> <i>credit answers from labelled diagrams</i>	3 max
		[Total: 11]