



RECOGNISING ACHIEVEMENT

**Subject: Transport Code: 2803/01**

**Session: January Year: 2002**

**Mark Scheme**

<b>MAXIMUM MARK</b>	<b>60</b>
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## 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.

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<b>Abbreviations, annotations and conventions used in the Mark Scheme</b>	/ = 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 <u>      </u> = (underlining) key words which <b>must</b> be used to gain credit ecf = error carried forward AW = alternative wording ora = or reverse argument
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<b>Question</b>	<b>Expected Answers</b>	<b>Marks</b>
1 (a)	1.5:1 / 3:2 ;; <i>calculation showing 96 &amp; 64. 1 mark if ratio wrong</i> <i>ecf if calculation wrong, credit for 1 mark a correct ratio from calculation given</i>	2
(b)	dropped; by half / from 3:1 to 1.5:1 / 3:2 <i>ecf for number quote based on calculation in a halved / AW on its own = 2 marks</i> <i>ora based on volume part of ratio having increased acceptable</i>	2
(c)	1 diffusion not adequate; 2 as not enough area (relative to volume) ora; 3 (and) distance too great; 4 so specialised surfaces developed; 5 an e.g. of a specialised surface; 6 linked by transport systems / ref to going to all parts of body; 7 example of a substance transported e.g. named gas, nutrient / named nutrient; (named) waste / (named) hormones / heat / water / etc; <i>reject food / blood</i>	
	<i>AW applies throughout. Look for the implication of the principles.</i>	3 max

[Total: 7]



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<b>Question</b>	<b>Expected Answers</b>	<b>Marks</b>
3	alveoli; A alveolus diffusion; thin / single / squamous / pavement, cell / epithelium / layer of cells; red (blood) cells / RBC / erythrocytes / haemoglobin; (steep / diffusion / concentration / oxygen) gradient / AW;	5

**[Total: 5]**

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Question	Expected Answers	Marks
4 (a)	A = vena cava; B = aorta; ( <i>ignore dorsal</i> ) C = left atrium; <i>accept atria</i> D = tricuspid / atrioventricular / AV, valve; ( <i>accept tricupsid</i> ) <i>(reject arterioventricular)</i>	4
(b) (i)	Y = 10.6 – 10.7 (mm);; <i>accept 11 / 11.0 (i.e. rounded up)</i>  <i>(units not needed unless the answer has been changed into e.g. cm)</i>  <i>(Working. 8/0.75. 2<sup>2</sup>/<sub>3</sub> x 4. 1 mark if answer wrong )</i>	2
(ii)	left ventricle / Y, more muscular / muscle ora for X; ( <i>i.e. a comparison</i> ) more pressure / force (for Y) / ora for X; ( <i>i.e. a comparison</i> ) left ventricle pumps to whole body / AW; right ventricle pumps to the lungs;  (Y pumps a further distance / ora = 1 mark)  <i>ignore refs to thickness unqualified – in stem of question</i> <i>Mark (ii) independently of (i)</i>	3 max
(c)	T; F; T; F; F;	5
<b>[Total: 14]</b>		

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Question	Expected Answers	Explanation	Marks
5 (a)	<p><i>Feature</i></p> <p>narrow / small diameter /AW;</p> <p>gaps (in wall / AW);</p> <p>thin wall / single cell layer / AW; <i>reject membrane</i></p> <p>smooth (inner) surface / endothelium;</p> <p>large total surface area;</p>	<p><i>Explanation</i></p> <p>contact with many cells / short diffusion distance / rapid diffusion / reduced rate flow qualified / AW;</p> <p>allows fluid / nutrients / AW, out / cells / proteins cannot pass; <i>reject plasma</i></p> <p>short pathway / easy access to tissue fluid / rapid diffusion / AW;</p> <p>smooth flow / prevents turbulence / AW;</p> <p>slows flow for exchange / allows more exchange / AW; <i>reject easier</i></p>	6 max
	<p><i>roles must match features. Can credit correct feature alone.</i></p> <p><i>reject refs to capillary density.</i></p>		
(b) (i)	<p>B = - 1.5 (kPa);;</p> <p><i>look for attempt to use the relationship to credit working if answer wrong</i></p> <p><i>e.g. (-3.3+1.6)-(-1.3+1.1) = 1 mark.</i></p> <p><i>1.5 = 1 mark.</i></p>		2
(ii)	<p>out (of capillary);</p> <p><b>(Be careful to check for this. Put tick or cross by arrow)</b></p>		1

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(c) lymph; *accept lymphatic – adjectival to fluid in stem of question*

water;

urea;

carbon dioxide;

proteins (made in tissues); *reject plasma proteins*

lymphocytes / named lymphocyte / WBC; *reject macrophage*

antibodies / AW;

hormones;

fats / AW;

(named) minerals;

Accept little / AW glucose; little AW oxygen; no RBCs; no plasma proteins;

*Reject waste, gases, nutrients. Take any three on list.*

*Max 2 for composition if RBCs or Plasma proteins mentioned as present*

1

+3

max

[Total: 13]



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Question	Expected Answers	Marks
6 (a)	<p><i>No marks for the features. Must get at least 1 point from each choice. reject prevents as an absolute once then ecf reject refs to concentration gradients throughout</i></p> <p><i>cuticle</i> wax / waxy / impermeable / waterproof; <i>accept thick / a barrier</i> reduces water loss / transpiration / evaporation / AW; reflective / AW; reduces heating up / AW;</p> <p><i>epidermis</i> thick walled; water passes slowly / reduces water loss / AW; ref to thick(er) upper epidermis / AW;</p> <p><i>small air spaces</i> less surface area; less evaporation / transpiration / water loss / AW; from mesophyll / into spaces / AW; spaces become saturated faster / AW; reduced water potential / diffusion, gradient;</p> <p><i>hairs (accept any reasonable description)</i> reduces air movement; trap water vapour / moist air; <i>reject water unqualified</i> reduced, water potential / diffusion, gradient; less, diffusion / transpiration / water loss / AW;</p> <p><i>stomatal chambers / sunken stomata</i> saturated air builds up / AW; not easily blown away / AW; reduced, water potential / diffusion, gradient; less, diffusion / transpiration / water loss; <i>accept correctly qualified to presence on lower surface;</i></p> <p><i>mark first three features</i></p>	6 max

[Total: 6]