OCR

RECOGNISING ACHIEVEMENT

2803/01 Transport

June 2005

Mark Scheme

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
	AW	=	alternative wording
	A	=	accept
	ora	=	or reverse argument

Question			Expected Answers	Marks
1	(a)	(i)	cut shoot under water ; insert into apparatus under water / AW ; full of water / no extra bubbles / no airlocks ; *applies to plant / apparatus* cut shoot at a slant ; dry off leaves / AW ; ensure , air / water , tight joints / AW ; use a , healthy / AW , shoot : allow time to acclimatise / AW ; keep , condition(s) / named condition(s) , constant ; measure per unit time / AW ; shut screw clip ; ref to scale ; e.g. note where bubble is at start / keep ruler fixed ; **R** *'move bubble to end' ideas*	**4 max**
		(ii)	water uptake / AW ; **R** water used	**1**
	(b)	(i)	103 ; **R** decimals	**1**
		(ii)	***R** refs to water or water particles* **1** boundary layer / saturated air / water vapour / AW, around leaf in still air / **A** ; **2** (which) fan / wind , removes / reduces , *ecf wrong ref to water* **3** ref steeper water potential gradient ; **R** concentration gradient **4** (therefore) faster / greater / more / AW, evaporation / diffusion ; *must be linked to above*	**3 max**
	(c)		set up in same (environmental) condition(s) / named condition ; calculate the rate per unit area of leaf / idea of getting same area of leaf in both ; detail of how this could be done ; e.g. draw round all leaves on graph paper replicates ; both picked at same time / same degree of turgidity / AW ; run for the same time / AW ;	**2 max**
				[Total: 11]

Question			Expected Answers	Marks
2	(a)	(i)	29 ;	1
		(ii)	fetus gains oxygen from, maternal blood / mother / AW ; across placenta ; partial pressure / AW, of oxygen in placenta is low ; 2-4 kPa ; both in the fetal and maternal parts / AW ; maternal haemoglobin releases oxygen ; fetal haemoglobin has a high(er) affinity for oxygen ; ref to maintaining diffusion gradient ; oxygen needed for , respiration / energy release / AW ; **R** energy production	**4 max**
	(b)		*accept answer written in terms of adult haemoglobin* affinity (of fetal haemoglobin) would be too high ; would not release oxygen readily enough / AW ; ref to idea that adult females will need difference with their fetuses in due course ; ref to high partial pressure of oxygen in lungs allowing loading with Hb with lower affinity ;	**2 max**
				[Total: 7]

Question			Expected Answers	Marks
3	(a)	(i)	**A** = pulmonary artery ; **B** = bicuspid valve ; A atrioventricular / AV, valve *mark first on list* **R** 'arterio…'	2
		(ii)	arrows correctly positioned on left side only ;	1
		(iii)	**1** wave of excitation / impulse / AW, stops ; **2** at the AVN / no transmission to heart apex / AW ; **3** no ventricular, contraction / systole ; **4** fibrillation / described e.g. heartbeat, unco-ordinated / irregular / no rhythm ; **5** blood not squeezed , upwards / out of ventricles / AW ; **A** ref to pressure change **6** atrial contraction continues ;	2 max
		(iv)	*credit answers written in context of what would happen if there was a hole* stops oxygenated and deoxygenated blood mixing ; ensures, (fully) oxygenated blood gets to the body / deoxygenated blood to lungs ; ref to possible drop in blood pressure if hole present ; ref to allowing different pressures being maintained on each side / AW ; AVP ; e.g. prevention of rise in heart rate if two sides not separated	2 max
	(b)	**S1**	three named layers ;	
		S2	(tunica intima / inner layer / AW) endothelium ;	
		S3	(tunica intima / inner layer / AW)) squamous (epithelial) cells ;	
		S4	(tunica media / middle layer / AW), thin / narrow / AW ;	
		S5	(tunica media / AW), muscle and elastic tissue ; **R** large amounts *refs to collagen neutral*	
		S6	(tunica externa) collagen ; **R** if muscle mentioned here	
		S7	valves ;	
		S8	large / wide, lumen ; ***max 4 S marks*** *credit S marks from labelled diagrams*	
		F9	smooth , endothelium / epithelium / lining / AW, reduces friction ; **R** if smoothness related to muscle	
		F10	credit one reference to, thinness / strength , of wall withstanding low pressure ;	
		F11	ref to thinness of wall to allow skeletal muscle to squeeze vein ;	
		F12	valves to prevent backflow / AW ;	
		F13	ref to, wide lumen / walls distending , to accommodate large volume of blood ;	
		F14	detail of this e.g. relationship between large volume and slow flow rate ; ***max 3 F marks***	6 max
			QWC – legible text with accurate spelling, punctuation and grammar ;	1
				[Total: 14]

Question	Expected Answers	Marks

4 (a) water moves down a water potential gradient / AW ;
by osmosis ;
(ref to roots being below –50 kPa means) water will enter (the root) ; **2 max**

(b) *function must match adaptation, adaptation can stand alone*
assume answer is about water vapour unless clearly wrong e.g. water droplets

covered in hairs ;
reflect heat *or* water vapour, trapped / not blown away ;

thick, waxy layer / cuticle / AW ;
reduces loss (via the epidermis) / reflects heat ; **R** no loss
if cuticle related to reflective nature, 'thick' not needed

small / AW , leaves ; **A** no leaves (e.g. cacti) / needles / spines / spikes **R** thorns
reduced surface area for loss / reduces number of stomata ;
R *ref to spines etc related to preventing consumption by herbivores*

sunken stomata / AW ; ***A*** *substomatal chamber hairs as an alternative here*
water vapour, trapped / not blown away ;

rolling up of leaves / curled leaves ;
less surface area / stomata on inside *or* water vapour, trapped / not blown away ;

small air spaces in the mesophyll ;
quickly become fully saturated / reduced area for loss ;

stomata, shut in day / open at night / AW ;
day hotter / night cooler ;

AVP ; e.g. reduced stomatal number plus reason
AVP ; timed leaf fall
rosette of leaves close to ground **4 max**

[Total: 6]

Question	Expected Answers	Marks
5 (a)	diffusion / down a (concentration) gradient ; dissolves in the water film / goes into solution / AW ; crosses , cell(s) / named cell / cytoplasm / plasma / membrane(s) / wall of alveolus or capillary ;	**2 max**
(b)	*two from* biconcave / AW ; large surface area to volume (ratio) ; optimum oxygen uptake / fast diffusion ; ora for oxygen release at tissues **max 2** for this feature small / about 7μm (diameter) / about same size as capillary / AW ; all haemoglobin close to surface / fast diffusion / short diffusion path / capillaries can be small to get close to all tissues / (RBC) close to capillary wall for exchange / AW ; no nucleus / no *or* few organelles ; maximum space, for oxygen carriage / haemoglobin ; elastic / flexible / pliable , membrane ; allows them to go along capillaries ;	**4 max**
(c)	large nucleus / very little cytoplasm / non-granular cytoplasm / about the same size as red blood cells but with a nucleus ; **A** from a diagram **R** nucleus unqualified / bean-shaped nucleus / lobed nucleus *only accept first answer if more than one feature listed, **BUT** 'large' alone is not a feature, so **R** e.g. large bean-shaped nucleus*	1
		[Total: 7]