

Biology GCSE Revision

## Topic 2

# Organisation

Booklet 2 of 2

- Human Transport System
- Plant Transport System

## Mark Scheme

[illegible]

**Question 1 continues on the next page . . .**

## Question 1 continued

question	Answers	extra information	mark
1(c)(i)	F artery	accept arteriole / branch of pulmonary artery	1
	G capillary		1
	H vein	H accept venule / branch of pulmonary vein;	1
1(c)(ii)	F (Pulmonary artery) has <u>less</u> oxygen / <u>more</u> carbon dioxide / <u>more</u> glucose/sugar	accept F (Pulmonary artery) is deoxygenated accept converse for H (Pulmonary vein) 'It' refers to F	1
<b>Total</b>			<b>12</b>

2(a)(i)	left ventricle		1	AO1 3.2.1c
2(a)(ii)	aorta	ignore artery allow aortic (artery)	1	AO1 3.2.1d
2(a)(iii)	(to keep) blood flowing in the right / one direction or prevent backflow (of blood)	ignore ref to veins	1	AO1 3.2.1e

2(b)	<p>Reasons for:</p> <ul style="list-style-type: none"> <li>• less likely to die (44% cf. 59%)</li> <li>• lower risk of death from having a second operation</li> <li>• lower risk of heart infections</li> <li>• less chance of the valve stopping working</li> <li>• longer lasting</li> <li>• doesn't cause rejection</li> <li>• avoids religious issues of using organs from a pig or no ethical issue from using part of a living organism</li> </ul> <p>Reasons against:</p> <ul style="list-style-type: none"> <li>• chance of death by bleeding is increased</li> <li>• offers no advantage against clots or equal risk of blood clots</li> <li>• have to take anti-clotting drugs for life</li> <li>• can be noisy</li> </ul>	<p>max 3 marks if only reasons for or reasons against given</p> <p>allow converse for each point if clearly referring to the pig tissue valve</p> <p>ignore cost</p> <p>allow doesn't stop working</p> <p>allow been used for a longer period of time</p> <p>ignore religion or ethical unqualified</p>	4	AO3 3.2
2(c)	<p>(inserted to) keep the (coronary) artery / arteries open</p> <p>allows more blood to flow (to the heart muscle) or return blood flow to normal</p>	<p>do <b>not</b> allow veins</p> <p>allow (more) glucose / oxygen to reach the heart (muscle)</p>	<p>1</p> <p>1</p>	AO1 3.2.1f
<b>Total</b>		<b>9</b>		

Question	Answers	Extra information	Mark	AO / spec ref.
4(a)(i)	defence against or destroy pathogens / bacteria / viruses / microorganisms	do not allow 'destroy disease' accept engulf pathogen / bacteria / viruses / microorganism  accept phagocytosis  accept produce antibodies / antitoxins  allow immune response	1	AO1 3.2.2d
4(a)(ii)	they are small fragments of cells		1	AO1 3.2.2e
4(b)	liver  kidney(s)	in this order only	1  1	AO1 3.2.2b
4(c)	any two from: <ul style="list-style-type: none"> <li>that it doesn't cause an immune response or isn't rejected / damaged by white blood cells</li> <li>whether it is a long lasting material / doesn't decompose / corrode / inert</li> <li>if it is strong (to withstand pressure)</li> <li>it will open at the right pressure</li> <li>that it doesn't cause clotting</li> <li>that it doesn't leak or it prevents backflow</li> <li>non toxic</li> </ul>	ignore correct size	2	AO3 3.2
Total			6	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)(i)	doesn't have valves	allow veins have valves	1	AO1 3.2.1e
	has a thicker wall <b>or</b> thicker layer of muscle	allow has a smaller lumen ignore references to elastic (in walls)	1	
6(a)(ii)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• (artery has) more oxygen</li> <li>• (artery has) more glucose</li> <li>• (artery has) less carbon dioxide</li> <li>• (artery has) less lactic acid</li> </ul>	ignore reference to pressure accept converse for veins if veins is clearly stated  allow (artery has) more amino acids / fatty acids  ignore urea	2	AO1 3.2.1g
6(b)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• no rejection</li> <li>• abundant supply</li> <li>• low risk of infection</li> <li>• longer shelf life</li> </ul>	ignore side effects  allow no tissue matching required  allow named example ie HIV, CJD  allow less space needed for storage	2	AO2/3 3.2
<b>Total</b>			<b>6</b>	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• carbon dioxide / CO<sub>2</sub></li> <li>• urea</li> <li>• protein</li> <li>• water / H<sub>2</sub>O</li> <li>• hormones / insulin</li> </ul>	ignore food / waste / alcohol / drugs / enzymes ignore glucose and oxygen  allow <b>two</b> correct hormones for 2 marks allow <b>two</b> correct food components for 2 marks allow antibodies allow antitoxins	2	AO1 321a,322b /c,331a
2(b)(i)	plasma  platelets		1  1	AO1  322a
2(b)(ii)	(cardiac) muscle	allow muscular	1	AO1 321b



Question	Answers	Extra Information	Mark	AO / Spec. Ref
2(c)			6	AO3 32, 321f
Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a 'best-fit' approach to the marking.				
0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)	
No relevant content	There is a description of at least one advantage of the cow tissue valve  or a description of at least one disadvantage of the cow tissue valve.	There is a description of at least one advantage of the cow tissue valve  and at least one disadvantage of the cow tissue valve.	There is a description of the advantages and disadvantages of the cow tissue valve  or a description of several advantages of the cow tissue valve and at least one disadvantage.	
examples of the points made in the response Advantages of cow tissue valve: <ul style="list-style-type: none"><li>• abundant supply of cows</li><li>• so shorter waiting time</li><li>• no need for tissue typing</li><li>• quicker operation</li><li>• less invasive or shorter recovery time</li><li>• cheaper operation costs</li><li>• less operation / anaesthetic risks</li></ul> Disadvantages of cow tissue valve: <ul style="list-style-type: none"><li>• made from cow so possible objections on religious grounds</li><li>• new procedure so could be unknown risks</li><li>• risks of using a stent eg. blood clots, stent breaking or valve tearing</li><li>• not proven as a long term treatment</li><li>• may be rejected</li></ul>		extra information ignore information copied directly from the table without value added  ignore can take many years to find a suitable human donor  ignore ethical arguments  allow possible transfer of disease from cow		
Total				11

## Question 2

question	Answers	extra information	mark
2(a)(i)	rise then fall		1
	to peak at $0.48 \text{ dm}^3$ / after 1.2s		1
	(fall) back to 0 / (falling) back after 2.5s	allow 2.6s allow after a further 1.3s / 1.4s	1
2(a)(ii)		ignore contraction and relaxation of muscles ignore reference to pressures, ribcage expanding	
	rise / air in caused by upward/outward movement of ribcage		1
	decrease / air out caused by return of ribcage to original position/downwards and (rise / air in) by downward movement / flattening of diaphragm or (decrease / air out) by upward movement / doming of diaphragm		1  1

Question 2 continues on the next page ...

## Question 2 continued

question	Answers	extra information	mark
2(b)(i)	in iron lung <u>atmospheric / outside pressure</u> forces air into lungs	allow air sucked / drawn into lungs	1
	in modern respirator air forced (mechanically) into lungs	allow for one mark pressures acts externally in iron lung and internally in modern ventilator	1
2(b)(ii)	advantage any one from: <ul style="list-style-type: none"> <li>• more freedom of movement for patient</li> <li>• more portable</li> <li>• does not affect blood flow in lower body</li> </ul>	ignore cost	1
	disadvantage any one from: <ul style="list-style-type: none"> <li>• (tube in trachea) uncomfortable</li> <li>• more difficult to eat/talk</li> </ul>	allow it can damage / overinflate the lungs / over breathe	1
Total			10

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)(i)	diaphragm	accept phonetic spelling	1	AO2 312a
6(a)(ii)	(because) the volume (inside the jar) increases (causing) the pressure to decrease (and) air enters the balloon	maximum <b>two</b> marks if no reference to correct part of model  allow oxygen	1  1  1	AO2 312c
6(b)(i)	(so it moves by) diffusion  from a high concentration (of oxygen) to a low concentration  <b>or</b>  (because) there is a high(er) concentration (of oxygen) in the air <b>or</b> there is a low(er) concentration of oxygen in the blood	do <b>not</b> allow osmosis or active transport allow down its / oxygen concentration gradient from the air <b>or</b> to the blood  ignore reference to amount of oxygen	1  1	AO1 311a, 312b

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(b)(ii)	<p>many gill <u>filaments</u></p> <p>(give a) large surface / area</p> <p>or</p> <p>thin</p> <p>(so) short diffusion pathway</p> <p>or</p> <p>good blood supply</p> <p>(to) maintain the concentration gradient</p> <p>or</p> <p>water continually flows over them / continually ventilated</p> <p>(to) maintain the concentration gradient</p>	<p>must be in the correct pairs to gain 2 marks</p> <p>do <b>not</b> allow surface area to volume ratio</p>	<p>1</p> <p>1</p>	<p>AO2</p> <p>311h/i/k</p>
<b>Total</b>			<b>8</b>	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)	(diaphragm) down or (becomes) flattened	do not allow up / in / expands ignore out ignore reference to contraction	1	AO1 3.1.2c
	(volume) increases		1	
5(b)(i)	(healthy alveolus has a) larger surface area	allow larger SA:Volume ratio accept converse for alveoli from person with emphysema allow walls between alveoli disintegrate or fluid accumulation in alveoli	1	AO2 3.1.1h/k
5(b)(ii)	less oxygen into the blood / muscles	less only needed once	1	AO2 3.1.1h/k 3.1.2b
	(so) less respiration	ignore ref. to anaerobic respiration	1	
	(and therefore) less energy is released (for exercise)	do not allow energy is produced / made do not allow energy for respiration	1	
Total			6	

## BL1HP

## Question 4

question	answers	extra information	mark
4	<u>A + B</u> most effective (treatment)	ignore descriptions of LDL levels	1
	D is (the most) effective (treatment)	D is the best single (treatment)	1
	neither A nor B (alone) are effective	allow increase risk of heart disease instead of not effective	1
	can't tell if C is effective <b>OR</b> <u>A + C</u> is not effective		1
<b>Total</b>			<b>4</b>

## Question 6

question	answers	extra information	mark
6(a)	(substance / chemical) that affects body chemistry / chemical reactions in the body		1
6(b)	<p>statin / aspirin / neither recommended</p> <p>any <b>five</b> from:</p> <ul style="list-style-type: none"> <li>• argued evaluation in favour of aspirin or statin or neither</li> </ul> <p>answers could include reference to</p> <p>for statins:</p> <ul style="list-style-type: none"> <li>• <u>more</u> people in studies</li> <li>• so data / findings <u>more</u> repeatable</li> <li>• reduces cholesterol <u>but</u> aspirin doesn't</li> <li>• aspirin (may) causes bleeding / poor clotting but statins do not</li> <li>• smaller (total) percentage suffer side-effects</li> <li>• monitored by doctor, aspirins not</li> </ul> <p>for aspirin:</p> <ul style="list-style-type: none"> <li>• <u>cheaper</u></li> <li>• can be bought over the counter <u>rather than</u> prescribed</li> <li>• statins cause serious damage / muscle damage / kidney failure but aspirins do not</li> </ul> <p>similarities:</p> <ul style="list-style-type: none"> <li>• both have similar effect on reducing (non-fatal) heart attacks</li> <li>• incidence of side-effects low in both</li> </ul>	<p>no mark, may be implied. If no recommendation or implication, max 4 marks</p> <p>answers should be comparative</p> <p>accept converse for statins / aspirin but <b>not</b> as advantage of one <b>and</b> disadvantage of other</p> <p>accept reliable for repeatable ignore accurate / precise</p> <p>allow reduces cholesterol but no evidence about aspirin allow aspirin causes bleeding / poor clotting but no evidence about statins</p> <p>allow (for aspirin) higher reduction of risk of heart attack</p>	5
Total			6



## Question 2

question	answers	extra information	mark
2(a)(i)	idea of 'normal' food / diet	e.g. 'the same as usual' or 'the same as before' allow balanced diet allow none of the slimming programmes ignore healthy diet	1
2(a)(ii)	for comparison	accept to show the test is valid allow to show the effect of the slimming programmes allow to see if the slimming programmes work ignore idea of fair test / reliable do not allow accurate / precise	1
2(b)(i)	(at first) large / rapid (loss / change of body mass)		1
	then small (loss / change) / levelling off	accept 'loss of mass decreased' for 2 marks	1
2(b)(ii)	all lost body mass (compared to the control group)		1
Total			5

## Question 4

question	answers	extra information	mark
4(a)(i)	rate of chemical reactions (in the body)		1
4(a)(ii)	any two from: <ul style="list-style-type: none"> <li>• heredity / inheritance / genetics</li> <li>• proportion of muscle to fat or (body) mass</li> <li>• age / growth rate</li> <li>• gender</li> </ul>	allow (body) weight / BMI  accept hormone balance or environmental temperature ignore exercise / activity	2
4(b)(i)	77	correct answer with or without working gains 2 marks  allow 1 mark for 70/56 or 1.25 or 5	2
4(b)(ii)	increase exercise  reduce food intake	accept a way of increasing exercise  accept examples such as eat less fat / sugar  allow go on a diet or take in fewer calories  ignore lose weight  ignore medical treatments such as gastric band / liposuction	1  1
Total			7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	legal, recreational drugs		1	AO1 1.3.1e
1(a)(ii)	any one from: <ul style="list-style-type: none"> <li>dependence / addiction</li> <li>withdrawal (symptoms) or described</li> </ul>	allow reliance eg headache / sickness / nausea ignore side effects alone	1	AO1 1.3.1h
1(b)(i)	idea of not part of the drug company or it is another company	not biased can be accepted for either part bi or bii, but not both	1	AO2 1.3.1a
1(b)(ii)	idea of so they will not be biased	allow results will be trustworthy	1	AO3 1.3.1a
1(b)(iii)	no / reduced feeling of pleasure (from alcohol) (so) less likely to drink alcohol	allow brain less sensitive to alcohol allow so easier to stop (drinking alcohol)	1 1	AO3 1.3.1
1(c)(i)	higher % or more boys (than girls) drink beer / lager / cider higher % or more girls (than boys) drink spirits / alcopops / wine	allow boys drink more beer / lager / cider allow girls drink more spirits / alcopops / wine allow valid descriptions using % figures	1 1	AO2 1.3.1
1(c)(ii)	any one from: <ul style="list-style-type: none"> <li>only 100 boys were surveyed</li> <li>only done on 15-year-olds</li> <li>no data on the table about boys that don't drink alcohol</li> <li>data only about UK</li> <li>boys may have lied about alcohol consumption</li> </ul>	allow small sample may not be representative allow not done on all ages allow none of the bars are 100% or highest bar is 88%	1	AO3 1.3.1
<b>Total</b>			<b>9</b>	

## Question 4

question	answers	extra information	mark
4(a)	solution in soil is more dilute (than in root cells)	concentration of water higher in the soil (than in root cells)	1
	so water moves from the dilute to the more concentrated region	so water moves <u>down</u> (its) concentration gradient <u>or</u> water moves from a high concentration <u>of water</u> to a lower concentration	1
	concentration of ions in soil less (than that in root cells)		1
	so energy needed to move ions <u>or</u> ions are moved against concentration gradient	the direction of the concentration gradient must be expressed clearly  accept correct reference to water potential or to concentrations of water	1
4(b)	any <b>three</b> from: <ul style="list-style-type: none"> <li>• movement of water from roots / root hairs (up stem)</li> <li>• via xylem</li> <li>• to the leaves</li> <li>• (water) evaporates</li> <li>• via stomata</li> </ul>		3
4(c)(i)	0.67/0.7	accept 0.66, 0.666666... or $\frac{2}{3}$ or 0.6 correct answer gains 2 marks with or without working if answer incorrect allow evidence of $\frac{100}{150}$ for 1 mark do <b>not</b> accept 0.6 or 0.70	2

Question 4 continues on the next page . . .

## Question 4 continued

question	Answers	extra information	mark
4(c)(ii)	during the first 30 minutes any one from: <ul style="list-style-type: none"> <li>• it was warmer</li> <li>• it was windier</li> <li>• it was less humid</li> <li>• there was more water (vapour) in the leaves</li> </ul>		1
	so there was more evaporation or stomata open during first 30 minutes or closed after 30 minutes (1) so faster (rate of) evaporation in first 30min or reducing (rate of) evaporation after 30min (1)	ignore 'water loss'	1
<b>Total</b>			<b>11</b>

Question	Answers	Extra information	Mark	AO / spec ref.
5(a)(i)	guard (cells)	allow phonetic spelling	1	AO1 3.1.3e
5(a)(ii)	any <b>one</b> from: <ul style="list-style-type: none"> <li>allow carbon dioxide to enter</li> <li>allow oxygen to leave.</li> </ul>	ignore reference to cells allow control loss / evaporation of water <b>or</b> control transpiration rate allow 'gaseous exchange'	1	AO1 3.1.3a, c,e
5(b)(i)	200	correct answer gains 2 marks with or without working  allow 1 mark for $0.1 \times 0.1 = 0.01$ (mm <sup>2</sup> )	2	AO2 3.1.3
5(b)(ii)	more / a lot of / increased water loss	allow plant more likely to wilt (in hot / dry conditions)	1	AO3 3.1.3d
5(c)(i)	0.12		1	AO2 3.1.3
5(c)(ii)	the lower surface has most stomata  stomata are now covered / blocked (by grease)  so water cannot escape / evaporate from the stomata	ignore waterproof to gain credit stomata must be mentioned at least once	1  1  1	AO3 3.1.3c, d
<b>Total</b>			9	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	guard (cells)	allow phonetic spelling	1	AO1 3.1.3e
2(b)(i)	as carbon dioxide (concentration) increases, the (mean) number of stomata decreases	allow there is a <u>negative correlation</u>	1	AO2 3.1.3
	(there is a) rapid drop initially	allow use of any number between 1.5 and 3.0 to indicate "initially"	1	
2(b)(ii)	(there is) more carbon dioxide so plant doesn't need as many stomata (to obtain the amount needed)  or (there is) less carbon dioxide so the plant needs more stomata (to obtain enough)		1	AO3 3.1.3c
2(c)(i)	may lose too much water	allow plant may wilt ignore references to oxygen / carbon dioxide  plants lose a lot of water is insufficient  ignore flaccid	1	AO3 3.1.3d
2(c)(ii)	any one from: • hot • dry • windy	ignore environments unqualified eg desert	1	AO3 3.1.3d
<b>Total</b>			<b>6</b>	

<b>Question</b>	<b>Answers</b>	<b>Extra information</b>	<b>Mark</b>	<b>AO / Spec. Ref.</b>
<b>3</b>			<b>6</b>	<b>AO1</b>
Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a ‘best-fit’ approach to the marking.				3.1.1a/b/g 3.1.1a/d 3.2.3a
<b>0 marks</b>	<b>Level 1 (1–2 marks)</b>	<b>Level 2 (3–4 marks)</b>	<b>Level 3 (5–6 marks)</b>	
No relevant points are made	At least <b>one</b> process (P) for obtaining a material is given <b>or</b> at least <b>one</b> vessel (V) and the material it carries is given <b>or</b> there is a description of the direction of movement (M) for at least <b>one</b> material	At least <b>one</b> process for obtaining a specified material is given <b>and</b> is correctly linked to the vessel that the material is transported in <b>or</b> correctly linked to a description of the direction of movement of the material	Processes used for obtaining specified materials are given. <b>and</b> correctly linked to the vessels that the materials are transported in <b>or</b> correctly linked to a description of the direction of movement of the materials. <b>For full credit,</b> in addition to the above descriptors at least <b>one</b> of the processes must be linked to the vessel that the material is transported in <b>and</b> the direction of the movement of the material.	
examples of points made in the responses: (P) taken up by diffusion or active transport <ul style="list-style-type: none"> <li>• from an area of high to low concentration (diffusion) <b>or</b> an area of low to high concentration (active transport)</li> </ul> (V) travels in the xylem (M) to the leaves <b>or</b> from the roots / soil  Water: (P) taken up by osmosis <ul style="list-style-type: none"> <li>• from an area of low to high concentration</li> </ul> (V) travels in the xylem (M) to the leaves <b>or</b> from the roots / soil (P) transpiration stream <ul style="list-style-type: none"> <li>• movement replaces water as it evaporates from leaves</li> </ul> (V) in the xylem  Sugar: (P) made during photosynthesis (V) travels in the phloem (M) to other parts of the plant <b>or</b> to storage organs <b>or</b> travels up and down		extra information            allow high concentration of water to low concentration of water allow from high water potential to low water potential ignore along a concentration gradient		
Total				<b>6</b>



Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)	<u>xylem</u> transports mineral (ions)  <u>phloem</u> transports sugars	allow <u>xylem</u> transports water	1	AO1 3.2.3a
		allow <u>phloem</u> transports sucrose / glucose / carbohydrate	1	
		ignore minerals / ions transported in phloem  if no other marks given allow one mark for xylem and phloem		
5(b)(i)	lost the most water or lost water faster than the others	allow mass decreased the most	1	AO3 3.1.3d
	(it) has the greatest number of stomata (per mm <sup>2</sup> )		1	
	(and) water is lost through the stomata		1	
5(b)(ii)	(transpiration rate would be) lower	at least one comparative must be given	1	AO2/3 3.1.3d
	(because) slow(er) evaporation / diffusion (into the air) or (because) concentration gradient will be less	allow 'lower rate of evaporation' for these 2 marks	1	
	(due to) high(er) humidity	allow air becomes saturated	1	
Total			8	