

Interactive Example Candidate Responses

Paper 2 (May/June 2016), Question 4

Cambridge International AS & A Level Biology 9700

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- (e) Planning the prevention and control of measles using a vaccination programme means that financial costs must be considered.

State two examples of these costs.

1. Production of these vaccines
2. Storage and transport of these vaccines
- [2]

[Total: 14]

- 4 Fig. 4.1 is a simplified diagram of the circulatory system of a mammal. Some of the lymph system is also shown.

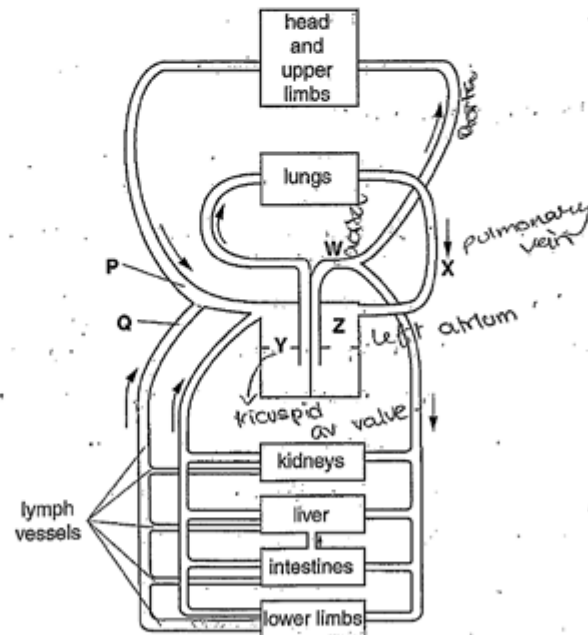


Fig. 4.1

Your
Mark

4(a)

4(b)

4(c)

4(d)

4(e)(i)

4(e)(ii)

Q4	Mark scheme
(a)	blood contained in (blood) vessels AW or blood contained in any three of heart, arteries, veins, capillaries ; systemic and pulmonary, systems / circulation ; A 'systematic' A described if <i>circulations not named</i> e.g. for each complete circuit (round the body) passes through heart twice from heart to lungs and back, then to (rest of) body and back [2]
(b)	W = aorta / aortic arch ; X = pulmonary vein ; Y = right atrioventricular / tricuspid, (valve) ; Z = left, atrium / auricle ; [4]
(c)	red blood cells ; A rbc A platelets A plasma proteins / named [1]
(d)	1 idea of carbon dioxide out (of blood to alveolus) and oxygen in (to alveolus from blood) ; 2 diffusion / diffuses or (movement from) high concentration to low concentration / down a concentration gradient ; A diffusion / pressure, gradient 3 (across) squamous epithelium / squamous cells (of alveolar wall) ; A pavement cells 4 (and) endothelium / endothelial cells (of capillary wall) ; A squamous cells but must be clear that this is for capillary wall 5 oxygen, into / AW, red blood cells ; 1 oxygen binds to Hb 6 steep gradient maintained by, ventilation / uptake by haemoglobin / blood carries oxygen away / blood arrives with carbon dioxide / deoxygenated blood arriving low in oxygen [max 4]
(e)(i)	F = nucleolus ; A nucleus G = cell surface / plasma, membrane ; [2]
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- (a) The type of circulatory system shown in Fig. 4.1 is a closed double circulation.

Explain what is meant by a closed double circulation.

'Closed' because all the blood vessels are interconnecting forming a complete circuit so blood never leaves the vessels.
'Double' because in one complete circulation blood passes through the heart twice.
.....[2]

- (b) With reference to Fig. 4.1, name:

blood vessel W Aorta
blood vessel X Pulmonary Vein
valve Y Tricuspid valve (Atrioventricular valve)
heart chamber Z Left Atrium [4]

- (c) State the component present in the blood at location P that is **not** present in the lymph at location Q in Fig. 4.1.

..... Red Blood Cells [1]

- (d) As blood passes through the capillary network in the lungs, gas exchange occurs.

Describe the process of gas exchange between the alveolus and the blood.

Occurs by diffusion down the concentration gradient of each gas.
O₂ etc. enters alveoli from outside air and due to thin ^{one-cell-thick} wall of alveolus and its curvature, diffusion distance is short and diffusion surface area is high so at high rate O₂ dissolves in moist lining of alveolar internal wall then diffuses through wall, entering through gaps in phospholipid bilayer and through same route into capillary binding with haemoglobin in red blood cell. Alveolus surrounded by capillaries with deoxygenated blood with high CO₂ content. CO₂ diffuses out of blood via capillary holes through phospholipid bilayer through alveolar ^{wall} by same path, dissolving in moist lining and diffusing into air inside alveolus. O₂ and CO₂ both non-polar so can pass through hydrophobic.....

Your
Mark

4(a)

4(b)

4(c)

4(d)

4(e)(i)

4(e)(ii)

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- (e) As blood passes through the small intestine, small soluble products of digestion such as glucose are absorbed into the capillaries to be transported to the liver.

Fig. 4.2 is a transmission electron micrograph of intestinal epithelial cells.

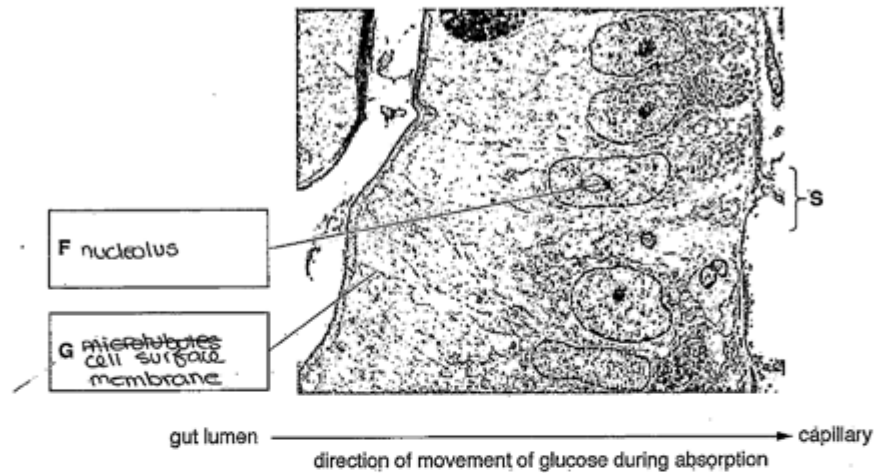


Fig 4.2

- (i) Write the name of cell structures **F** and **G** in the boxes provided on Fig. 4.2. [2]
- (ii) At the surface labelled **S**, movement of glucose molecules out of the intestinal epithelial cell occurs by facilitated diffusion.

Outline the features of facilitated diffusion of glucose molecules.

Transmembrane
Passive process. Protein molecule in cell membrane is a channel
protein that has a hydrophilic channel through it. This allows
water-soluble polar glucose to move through it to outside cell
down its concentration gradient. It would not be able to pass
through hydrophobic region of bilayer. Process is passive so
requires no ATP or energy.

[3]

[Total: 16]

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- (e) Planning the prevention and control of measles using a vaccination programme means that financial costs must be considered.

State two examples of these costs.

- 1 The cost of incubators ^{to grow the bacteria} are ~~expensive~~ expensive
- 2 The cost for making ^{producing} enzyme is expensive

[Total: 14]

- 4 Fig. 4.1 is a simplified diagram of the circulatory system of a mammal. Some of the lymph system is also shown.

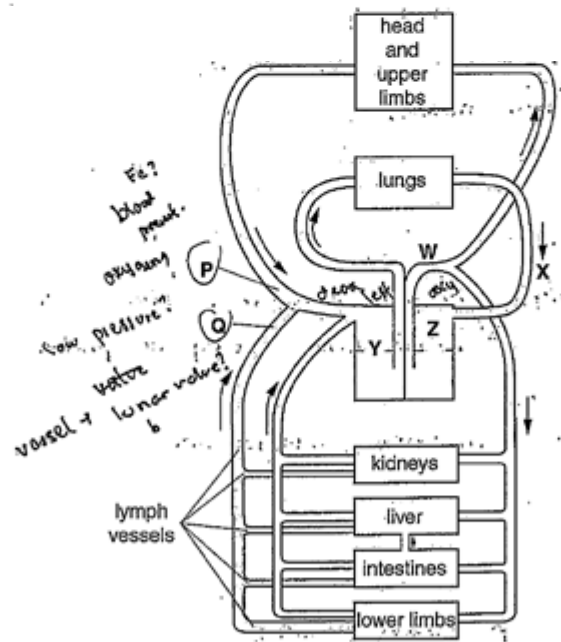


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- (a) The type of circulatory system shown in Fig. 4.1 is a closed double-circulation.

Explain what is meant by a closed double circulation.

It is when deoxygenated blood goes to the heart, to the pump to the lungs, and oxygenated blood goes to the heart again and to the ^{all} other parts of the body - and to the

[2]

- (b) With reference to Fig. 4.1, name:

blood vessel W aorta

blood vessel X pulmonary vein

valve Y tricuspid valve

heart chamber Z right atrium

[4]

- (c) State the component present in the blood at location P that is not present in the lymph at location Q in Fig. 4.1.

oxygenated blood oxygenated blood

[1]

- (d) As blood passes through the capillary network in the lungs, gas exchange occurs.

Describe the process of gas exchange between the alveolus and the blood.

Blood carries deoxygenated blood carries pumps by the heart at high pressure and diffusion occurs between the blood and the alveolus. Oxygen moves from high concentration in the lungs passing through the membrane of into the red blood cell. While, Carbon dioxide diffuses out to the low alveolus as

Your
Mark

4(a)

4(b)

4(c)

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- (e) As blood passes through the small intestine, small soluble products of digestion such as glucose are absorbed into the capillaries to be transported to the liver.

Fig. 4.2 is a transmission electron micrograph of intestinal epithelial cells.

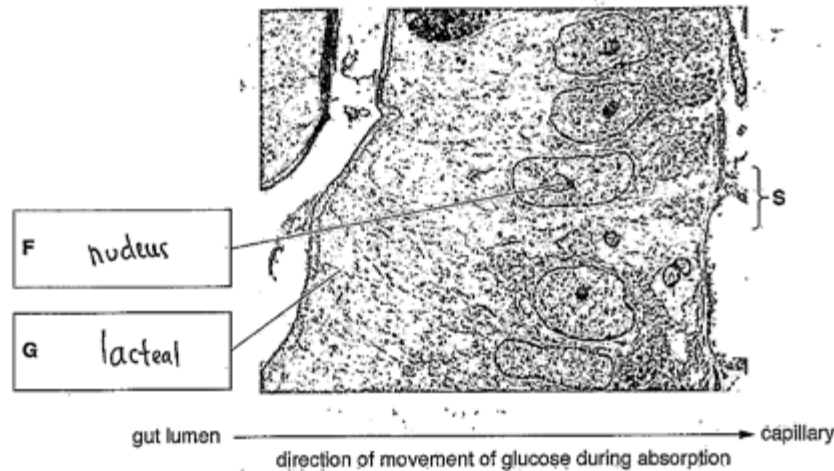


Fig 4.2

- (i) Write the name of cell structures F and G in the boxes provided on Fig. 4.2. [2]
- (ii) At the surface labelled S, movement of glucose molecules out of the intestinal epithelial cell occurs by facilitated diffusion.

Outline the features of facilitated diffusion of glucose molecules.

Glucose moves through the protein channel by diffusion as in the intestine gl concentration of glucose is high than the cells. thus glucose enters.

[Total: 16]

Your
Mark

4(a)

4(b)

4(c)

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- (e) Planning the prevention and control of measles using a vaccination programme means that financial costs must be considered.

State two examples of these costs.

- 1 A large number of population need the vaccination for free.....
.....
.....
2 The vaccination of measles also need booster which increase the cost.....
.....
.....[2]

[Total: 14]

- 4 Fig. 4.1 is a simplified diagram of the circulatory system of a mammal. Some of the lymph system is also shown.

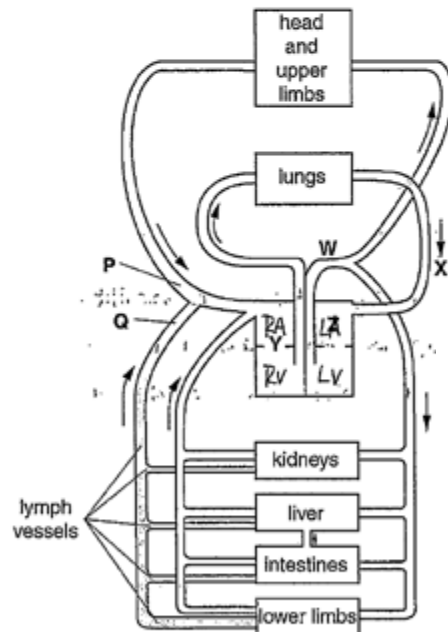


Fig. 4.1

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Mark

4(a)

4(b)

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4(e)(ii)

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- (a) The type of circulatory system shown in Fig. 4.1 is a closed double circulation.

Explain what is meant by a closed double circulation.

'closed' means same blood pass through one place twice which mean the blood leave from heart and finally goes into heart. 'Double' mean there are two different path which all pass through heart.

[2]

- (b) With reference to Fig. 4.1, name:

blood vessel W Aorta

blood vessel X Pulmonary vein

valve Y

heart chamber Z Left atrium

[4]

- (c) State the component present in the blood at location P that is **not** present in the lymph at location Q in Fig. 4.1.

Carbon dioxide

[1]

- (d) As blood passes through the capillary network in the lungs, gas exchange occurs.

Describe the process of gas exchange between the alveolus and the blood.

^{Carbon dioxide}
The ~~oxygen~~ in capillary diffuse to the alveolus in short distance down the concentration gradient. And the ~~carbon dioxide~~ Oxygen contain in the alveolus also diffuse from alveolus to blood in the capillaries. So the blood in capillary gain oxygen and released carbon dioxide and the alveolus gain carbon dioxide and released oxygen.

[4]

Your
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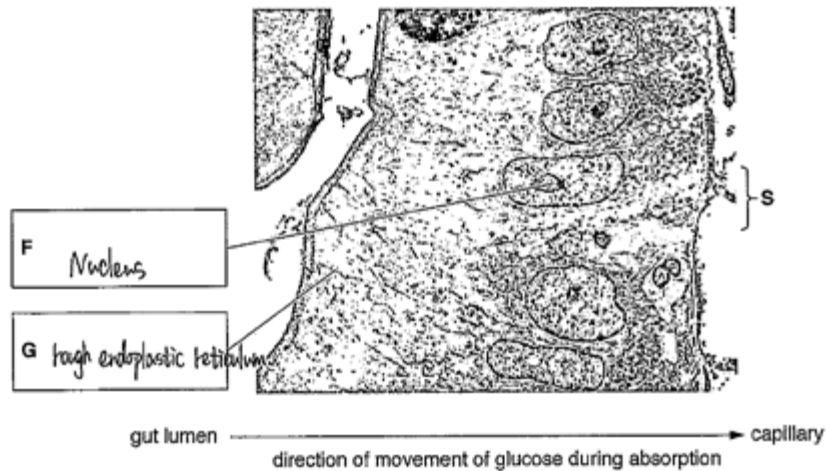


Fig 4.2

- (i) Write the name of cell structures **F** and **G** in the boxes provided on Fig. 4.2. [2]
- (ii) At the surface labelled **S**, movement of glucose molecules out of the intestinal epithelial cell occurs by facilitated diffusion.

Outline the features of facilitated diffusion of glucose molecules.

Facilitated diffusion is a kind of special diffusion which need a carrier protein as a media down the concentration gradient. Because glucose molecule is a large molecule which can not pass through cell membrane.

[3]

[Total: 16]

Your
Mark

4(a)

4(b)

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