



CHEMISTRY ONLINE
— **TUITION** —

Phone: +442081445350

www.chemistryonlinetuition.com

Email: asherrana@chemistryonlinetuition.com

BIOLOGY

ORGANISMS EXCHANGE SUBSTANCES

Level & Board	AQA (A-LEVEL)
TOPIC:	GAS EXCHANGE
PAPER TYPE:	SOLUTION - 1 PAPER 1
TOTAL QUESTIONS	6
TOTAL MARKS	33

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Gas Exchange - 1

1.

(a) They have a thin exchange surface - the alveolar epithelium is only one cell thick, which means there's a short diffusion pathway, which speeds up diffusion. The alveoli also have a large surface area - the large number of alveoli means there's a large surface area for gas exchange.

OR

Flattened cells

Reduces diffusion distance/pathway

Permeable

Allows diffusion of oxygen/carbon dioxide

(b) FEV1 : FEC ratio = 0.6(1) : 1

1.10–1.15

(c)

- Less carbon dioxide exhaled out of lung so more carbon dioxide remains (in lung so reduced diffusion/concentration gradient between blood and alveoli)
- Less movement of carbon dioxide out of blood more carbon dioxide stays in blood.

2.

(a) The difference of oxygen concentration between the artery and vein is larger in the fish than the human so the fish remove a greater amount of oxygen that they intake.

OR

In fish, blood leaving (V) has more oxygen than water leaving but in humans, blood leaving (V) has less oxygen than air leaving.

Difference in oxygen concentration between artery and vein is greater in fish than in humans so fish remove a greater proportion from the oxygen they take in.

(b) Blood and water continuously flow in opposite directions so the concentration gradient is maintained along the length of the lamellae.

3.

(a) When the lungs inhale, the diaphragm contracts and pulls downward. At the same time, the muscles between the ribs contract and pull upward. This increases the size of the thoracic cavity and decreases the pressure inside. As a result, air rushes in and fills the lungs.

(b)

K = Bronchiole

L = artery/vein

(c) Iodine solution stains starch a blue-black colour. The scientist used hematoxylin solution and not iodine solution to stain the lung tissue. Suggest why. Using Hematoxylin because it would stain the DNA and no starch is present in the lungs.

(d)

- From the being obese means you are less likely to have asthma
- Also, by living with a cat is reduces the likely you have asthma by 0.05 with statistically significant
- However, by burning wood can increase the likely hood or decrease by 0.06 this statically significant.

OR

In support

- Risk with asthma and living with cat or dog is statistically significant
- Link with obesity is highly significant

Not supported

- Risk with asthma and burned wood indoors is not statistically significant.

4.

(a) If alveolar epithelium cells die inside the human body they are replaced by non-specialized, thickened tissue. This is because the surface area of the alveoli is reduced which thus reduced the rate of gas exchange.

OR

- Reduced surface area
- Increased distance for diffusion
- Reduced rate of gas exchange

(b) No because 9% and 36/27% increase here to be linear: would be 180/171% increase.

5.

(a)

F = Filament

G = Secondary lamella / gill plate

(b) Fish gills use a design called 'countercurrent oxygen exchange' to maximize the amount of oxygen that their blood can pick up. They achieve this by maximizing the amount of time their blood is exposed to water that has a higher oxygen level, even as the blood takes on more oxygen.

OR

- Blood and water flow in opposite directions in the capillaries
- Concentration of oxygen in the blood is lower than in surrounding water, so oxygen diffuses into the blood
- Diffusion gradient maintained over full length of lamellae

6.

(a) Slow growth due to smaller no area of stomata for gas exchange.

(b) Stomata close to prevent water loss

less CO₂ uptake = less photosynthesis/glucose production.

I am Sorry !!!!!



DR. ASHAR RANA
M.B.B.S / MS. CHEMISTRY



- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
- Chemistry, Physics, Math's and Biology Tutor

CONTACT INFORMATION FOR CHEMISTRY ONLINE TUITION

- UK Contact: 02081445350
 - International Phone/WhatsApp: 00442081445350
 - Website: www.chemistryonlinetuition.com
 - Email: asherrana@chemistryonlinetuition.com
- Address: 210-Old Brompton Road, London SW5 OBS, UK