

Specimen answer 7

June 14 BIOL5 10a

10 Write an essay on one of the following topics.

EITHER

10 (a) How cells and organisms carry out exchanges with their external environment to maintain their internal environment.

[25 marks]

OR

10 (b) How energy is transferred within and between organisms.

[25 marks]

If you want to make a plan write it here.

Transpiration

Respiration

Gas exchange in lungs

Homeostasis

Carbon/Nitrogen cycle



~~Energy is transferred between organisms in many ways~~

In order to ~~prevent~~ maintain their internal environment, ~~and~~ allow the organisms to maintain homeostasis, ~~they~~ must maintain a relationship with their external environment which will provide energy, food sources, gases and many other substances to do this. One example of how this works is homeostasis involving blood temperature. When the blood temperature is too high, the hypothalamus is the thermoregulatory centre of the brain is notified. ~~Then~~ The hypothalamus responds by informing the heat loss centre. This then reduces the heat of the blood by ~~increasing~~ widening the arterioles near the surface of the skin, which allows blood to flow closer to the surface. This allows ~~used~~ heat to be lost through convection to the external environment, which is cooler than the internal temperature. Temperature is also reduced by sweating, which reduces skin temperature by water droplets on the skin evaporating, which ~~further~~ reduces temperature. ~~Eco~~ Ectotherms

Turn over ►



cannot self regulate their body temperature, instead relying solely on the external environment to aid them. Their body temperature is reduced or increased by behaviors such as basking, moving in and out of water and skin color (black absorbs more heat).

Another way in which internal environment is maintained is through the transpiration stream in plants. The transpiration stream is a stream of water which leaves the plant through the stomata, found on the underside of the leaf. This transpiration stream drags water up through the centre of the ^{tree} plant, which is dead and hollow. The loss of water allows the pressure to drag more water through the roots, containing nutrients essential to ~~plant~~ ^{growth}. This happens through the xylem.

Another main factor in maintaining homeostasis ^{using} ~~in the~~ external environment is the ~~absorption~~ ^{taking} in of ^{oxygen} and breathing out of carbon dioxide is respiration. Respiration helps maintain the ~~external~~ internal environment by providing a an



energy, source, ATP, to achieve homeostasis, and muscle contraction, among other things. Respiration occurs in the mitochondria of the cells, ~~using~~ ^{using} oxygen, which is taken in through the lungs is used as a final acceptor in the electron transport chain, so that electrons can be returned to the protons to begin. The carbon dioxide produced by respiration is also returned to the air, as it must be removed by the body to maintain internal environment, as it is poisonous in large quantities.

Another way in which internal environment is maintained is again based on CO_2 . In order to ~~maintain~~ ^{maintain} internal environment, the CO_2 ~~breathed out~~ ^{breathed out} goes into the carbon cycle. The carbon cycle is also a way in which plants get the carbon dioxide they need to photosynthesize, which again provides energy for maintaining homeostasis.

~~Another~~ The nitrogen cycle is another important way in which organisms ~~take in~~ ^{take in} maintain homeostasis. Nitrogen

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Senior examiner annotations				
#	Item	Page	Mark/symbol	Annotation
1	10	2	0	T – Temperature control. A-level detail but not enough explanation of how evaporation reduces blood temperature.
2	10	3	0	Relevant but not A-level detail.
3	10	3	0	W – Passage of water through plant. Ignore dead and hollow centre of the tree as this probably refers to xylem. Not enough detail.
4	10	3	0	L – lung function – No A-level detail here.
5	10	4	0	This is irrelevant. Goes too far beyond the scope of the title.
6	10	4	0	Nc – Nutrient cycles – Relevant selection but not enough detail.
7	10	4	9	Some A-level material but only in one/maybe two topics and a lot that is superficial. Some irrelevant material. Unistructural - awarded 9 marks.