

Specimen answer 8

June 14 BIOL5 10b

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.

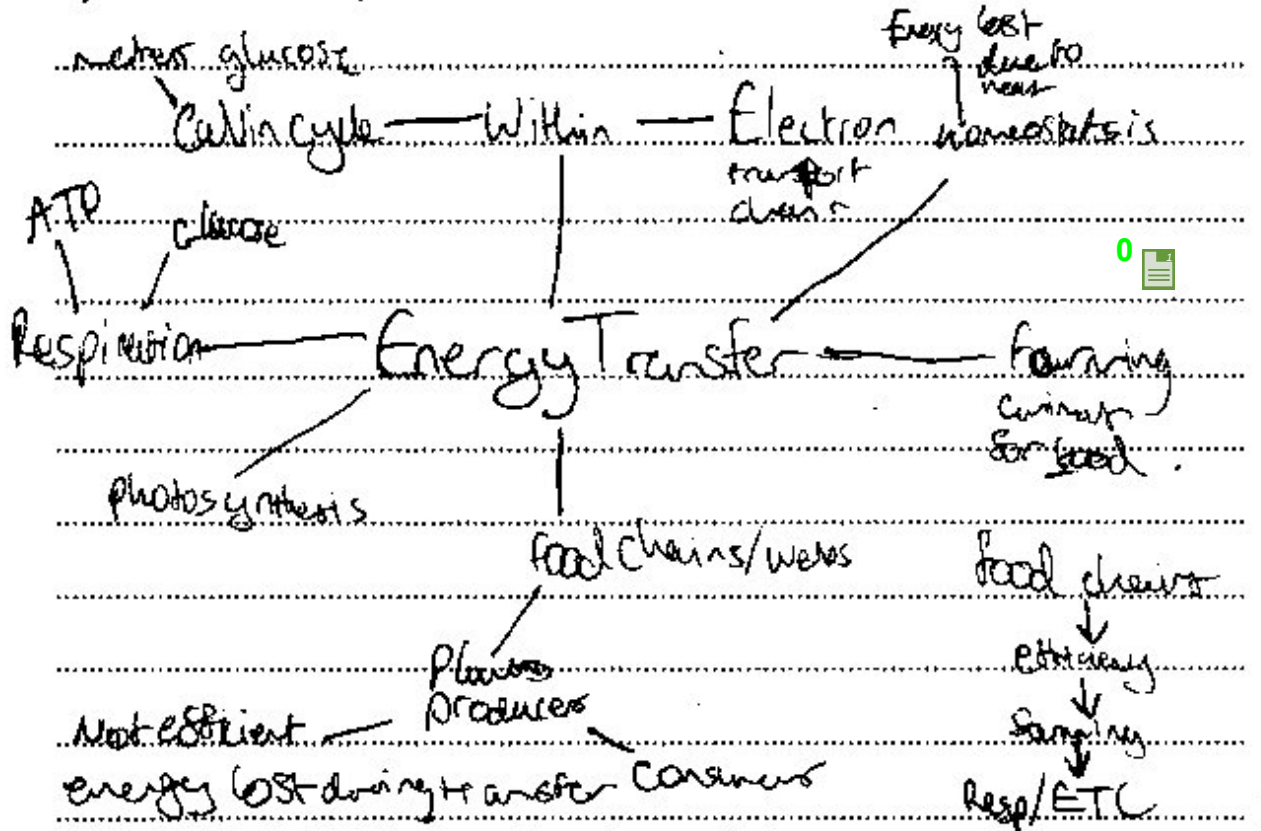
[25 marks]

OR

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

[25 marks]

If you want to make a plan write it here.



Energy transfer occurs all the time between organisms, one of the ways in which energy is transferred between organisms is through food webs and chains. The first part of a food chain is the sun, the sun provides light energy so that plants can photosynthesise and ~~produce~~ convert energy into growth. This is a relatively inefficient process as much light does not even reach the chloroplasts. Just under 2% of the light energy from the sun is converted into growth by plants. Plants convert this light energy into growth, when light ^{energy} hits the chlorophyll, electrons get excited and are emitted, there they undergo a series of oxidation and reduction reactions, the energy lost by these reactions the electrons is ~~converted into~~ ATP used to combine ADP + P_i to form ATP, which is an energy source. Following this the light-independent reaction occurs which ~~uses~~ ^{uses} ATP from the light-dependent reaction to form Triose Phosphate. This is fixed when Ribulose Biphosphate and CO₂ ^{react} to form Glyceral-3-phosphate, ATP ~~and~~ ^{and} reduced NAD are used to convert this into Triose phosphate, this is used to make glucose, which is used in respiration as a source of energy.

Turn over ►

During respiration glucose is broken down into ~~pyruvate~~ ^{pyruvate}, using NAD, also energy from this reaction ~~also~~ combines ADP + P_i to form ATP. Energy is also transferred during the electron transport chain, where ATP is formed at various stages using the energy ~~transferred~~ transferred. During respiration some energy is also transferred into heat energy.

After the producers in the food chain there are consumers, they eat the plants, so that they can transfer the energy into growth. Consumers eat the plants which contain proteins and carbohydrates. Starch and other carbohydrates are broken down in the salivary mouth, by enzymes in the saliva such as amylase. Starch is broken down into maltose, which can be broken down into glucose for use in respiration.

Endotherms that maintain their own body temperature often ~~lose~~ ^{require} more energy as more energy is transferred into maintaining body temperature. This is one of the reasons why to increase the efficiency of energy transfer in agriculture, intensive farming is used.



animals are ~~reared~~^{reared} in cramped and warm conditions, to reduce muscle contraction and to keep environment temperature close to the optimum body temperature. Muscle contraction is one ^{way in} which energy is transferred as ~~an~~ ATP is required to form crossbridges between myosin and actin and detach them, so reduced muscle contraction leads to increased efficiency.

Energy is also required by active processes such as active transport, which requires ATP to be broken down to release energy, so that ions can be taken up. Such as in an action potential when the sodium-potassium pump ~~takes~~^{takes} over, pumping sodium out and potassium ions in.

Overall energy is required for a variety of processes and is ~~transfere~~^{transferred} in many different ways between organisms and within them.

Senior examiner annotations				
#	Item	Page	Mark/symbol	Annotation
1	10	1	0	Plan noted.
2	10	2	0	Ec – Energy transfer through ecosystems noted but not enough detail.
3	10	2	0	Photosynthesis LDR detail.
4	10	2	0	P – Photosynthesis LIR.
5	10	3	0	R – Respiration noted and ETC.
6	10	3	0	Ec again – combined with first paragraph now sufficient detail.
7	10	3	0	D – Digestion noted but not enough detail.
8	10	4	0	F- Food production noted but not sufficient detail.
9	10	4	0	Mc – Muscle contraction and along with food production above is given credit.
10	10	4	0	N – Nerve impulses noted but no real detail.
11	10	4	18	Several topics linked to title/theme. A-level detail in some and no significant errors - or irrelevant material. Relational - awarded 18 marks.