

2021 GCE O Level Biology Suggested Answer

Paper 1

Questions to note: 1, 9, 12 & 36

1	2	3	4	5	6	7	8	9	10
C	B	D	D	A	D	C	A	D	A
11	12	13	14	15	16	17	18	19	20
B	A	B	B	A	D	C	A	C	D
21	22	23	24	25	26	27	28	29	30
A	A	D	D	D	C	B	C	C	C
31	32	33	34	35	36	37	38	39	40
B	C	C	B	A	C	D	B	A	D

Question to note:

Paper 2 (Section B)

- 7 (a) (i) **Draw a best fit line**
 x-axis label and unit [1]
 plots [1]
 line of best fit [1]
- (ii) **State**
 0.31 mol dm⁻³
- (iii) **State**
 +0.5/0.6%
- (b) **Explain**
 For sucrose concentrations 0.0 to 0.4 mol dm⁻³, the solution has a higher water potential than the cell sap of the potato strip. Hence, water enters the cell sap of the potato strip by osmosis and the potato strip increases in length.
 For sucrose concentrations 0.6 to 1.0 mol dm⁻³, the cell sap of the potato strip has a higher water potential than the solution. Hence, water enters the cell sap of the potato strip by osmosis and the potato strip decreases in length.
 Data from graph provided.
- (c) **Draw and label**
 Drawing: Cell membrane and cytoplasm pull away from cell wall, Small central vacuole [1]
 Label: must label cell membrane and vacuole [1]

8 (a) **Fill in table**

structure	name	explanation
1	hair	Stands in a cold environment and traps air which prevents heat loss from surface of skin
2	nerve endings/ thermoreceptors	Sensory receptors that detect low temperature in the environment
3	sensory neurone	Transmit nerve impulses from nerve endings to relay neurone in brain
4	subcutaneous fat	Insulating layer that reduces heat loss
5	blood capillaries	Constricts in cold environment to reduce transport of blood to surface of skin which reduces heat loss

(b) **Explain**

Homeostasis is the maintenance of a constant internal environment despite changes in the external environment. [1]

When there is a change in the environment, a sequence of events known as the corrective mechanism, restores the internal environment back to its original state. This is known as the negative feedback process. [1]

(c) **Describe**

When blood and skin temperature deviates from the set point, thermoreceptors in the skin detect the change and send nerve impulses to the hypothalamus in the brain. [1]

The hypothalamus is stimulated to produce nerve impulses that are transmitted to relevant body parts to carry out the corrective mechanism that brings the blood and skin temperature back to the set point. [1]

For example, when blood and skin temperatures increases above the norm, the hypothalamus is stimulated to transmit nerve impulses to the sweat glands which produce more sweat. When water in the sweat evaporates, heat is lost through latent heat of vapourisation. [1]

9 E (a) **Draw an arrow**

Draw an arrow and label R at either point where the graph of photosynthesis and respiration meet. [1]

(b) **Describe and explain** (Any 5 with D & E)

D: Rate of photosynthesis increases rapidly from 0 au at 6am to 50 au at 12pm.[1]

E: From 6am to 12pm, light intensity increases. More light energy can be absorbed by chlorophyll in leaves to be converted to chemical energy during the process of photosynthesis.[1]/ Also, as light intensity increases, temperature increases. Photosynthetic enzymes and substrates gain kinetic energy, form more enzyme-substrate complexes and more products. Thus, rate of photosynthesis increases. [1]

D: Rate of photosynthesis is the highest at 50 units at 12pm.[1]

E: Light intensity is the greatest and therefore the rate of photosynthesis is the highest.[1]

D: Rate of photosynthesis decreases from 50au at 12pm to 0au at 6pm.[1]

E: Rate of photosynthesis decreases as light intensity decreases.[1]

(c) **Using....explain**

The glucose produced during photosynthesis is oxidised during respiration to release energy to support plant activities.[1]

The plant respire throughout the day, for 24 hours.[1]

When rate of photosynthesis increases from 6am to 6pm, the rate of respiration also increases. [1]

Hence, as all the glucose is utilised by the plant, the overall mass of the plant is not increasing. [1]

9 O (a) **Describe (two functions)**

The ovary produces eggs which will mature and be released from the ovaries monthly when the female reaches puberty.[1]

Each ovary also produces hormones such as oestrogen and progesterone.[1]

The hormones are responsible for the development and maintenance of the secondary sexual characteristics in females. [1]

(b) **Compare**

In a pregnant woman, the progesterone level increases from about 25au in the first month to 250au by the ninth month. [1]

However, in a woman who does not get pregnant, the progesterone level increases during her menstrual cycle every month from around day 14 to around day 23.[1] When fertilisation does not occur, it decreases from around day 24 to day 28. [1] This cycle repeats every month.

(c) **Describe**

The sugary fluid secreted by the mature stigma causes the pollen grain to start germinating. A pollen tube grows out of the pollen grain and carries two male gametes. [1]

The pollen tube secretes enzymes that digest the surrounding tissues of the stigma and style as it grows down the style to the ovary. [1]

The pollen tube enters the ovule through the micropyle, absorbs sap and burst releasing the two male gametes into the ovule. [1]