2022 GCE O Level Biology Suggested Answer

Paper 1

Questions to note: 15,33,40

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

Paper 2 (Section B)

Question to note:

1 (a) Any 3:
- It contains haemoglobin which binds to oxygen and transports it around the body. [1]
- It has a circular biconcave shape which increases the surface area to volume ratio to take in and release oxygen at a faster rate. [1]
- It does not have a nucleus. This enables the cell to store more haemoglobin for transport of oxygen. [1]
- It is flexible to squeeze through tiny capillaries and be transported to body cells. [1]

(bi) When this person is walking up a flight of stairs, there will be a higher rate of aerobic respiration to release more energy for increased muscle contractions.[1]
This individual with only 91% of oxygen saturation will have insufficient oxygen will be transported to the muscle cells and therefore will have a higher breathing rate.[1]
Hence, this person will be breathless and will feel tired easily compared to a healthy person walking up the same flight of stairs.[1]

(bii) Blood vessel: pulmonary vein [1]
Reason: it is transporting blood from lungs after gaseous exchange/oxygenation.[1]

(c) transported to the lungs where it is excreted from the body/ removed during exhalation [1]
White blood cells [1]

2 (ai) palisade mesophyll cell [1]
(aii) Vacuole [1]
(aiii) Nucleus/ribosomes/mitochondrion [1]

(b) As the plant is placed in low light intensity, the chloroplast would move towards the source of light within the cell [1]
So that chlorophyll in the chloroplast absorb maximum sunlight [1] for photosynthesis [1] which is essential for plants growth and development

(c) Any 3:
Both processes do not require energy[1]
movement of water and carbon dioxide down the concentration gradient.[1]
Movement of water requires the presence of a partially permeable cell membrane while movement of carbon dioxide from the air into the leaf does not require a membrane [1]
The movement of water into a cell is via osmosis while the movement of carbon dioxide into the cell is via diffusion. [1]

3 (a) Long filament [1]
Pendulous and protrude out of the flower [1]

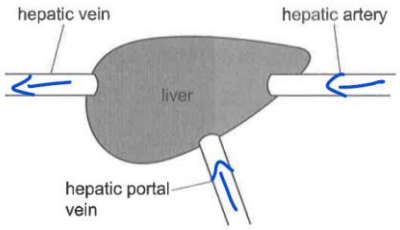
(bi) Carbon, hydrogen and oxygen [1]

(bii) White flour has a lower mass of indigestible carbohydrates/ protein/ fat in 100g of flour as compared to brown flour.[1] (with data) [1]
White flour has a higher mass of digestible flour in 100g of flour as compared to brown flour.[1] (with data) [1]

(biii) Add 2 cm^3 of biuret solution to 2cm^3 of flour.
Shake well and allow the mixture to stand for 5 minutes. [1]
When the blue biuret solution turns violet, proteins are present.[1]

(c) When the vili decreases in size and number, it reduces its the surface area to volume ratio [1].
This will then decrease the rate of absorption of digested nutrients[1]
- Less glucose and amino acids absorbed into blood capillaries
- Less fats absorbed into lumphatic capillaries/lacteals [1]

4 (ai)



[2]

(aii) Hepatic vein

(bi) The population sizes could be different in the two areas. Hence, stating the number of cases per 100,000 men will allow for more accurate comparison between the two areas.

(bii)
- The number of cases of serious liver disease increased in both areas from 1960 to 1975. In area A, the increase was from 30 per 100 000 men to about 62 per 100 000 men while in area B, the increase was from about 6 per 100 000 men to about 10 per 100 000 men. [1]
- The number of cases of serious liver disease continued to increase for area B from 10 per 100 000 men in 1975 to 28 per 100 000 men in 2000 while the number of cases of serious liver disease decreased in area B from 62 per 100 000 men in 1975 to 38 per 100 000 men in 2000.[1]
- The number of cases of serious liver disease in area A is higher than in area B from 1975 to 2000.[1]

(biii) Reduced alcohol consumption/ increased awareness of alcohol abuse [1]

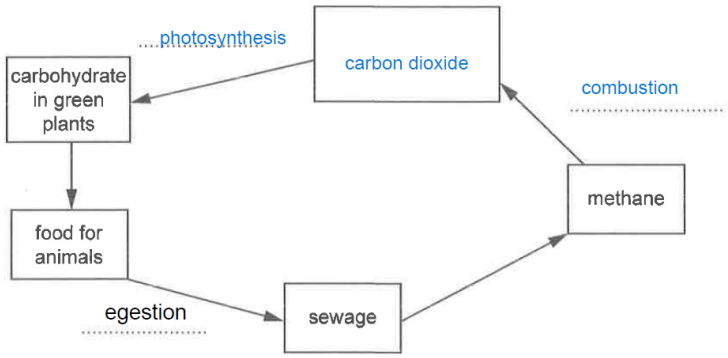
(biv) Any 2: [2]
- Reduced self-control
- Slows down brain function
- Increases/slower reaction time
- Blurred vision

(ci) Target organ is the organ, liver, where the hormone, glucagon, exerts its effect. [1]

(cii) When blood glucose levels fall below the normal, [0.5]
glucagon stimulates the liver to convert stored glycogen to glucose. [1]
Which is then released into the blood stream increasing the blood glucose level back to normal.[0.5]

5 (a) Temperature/pH

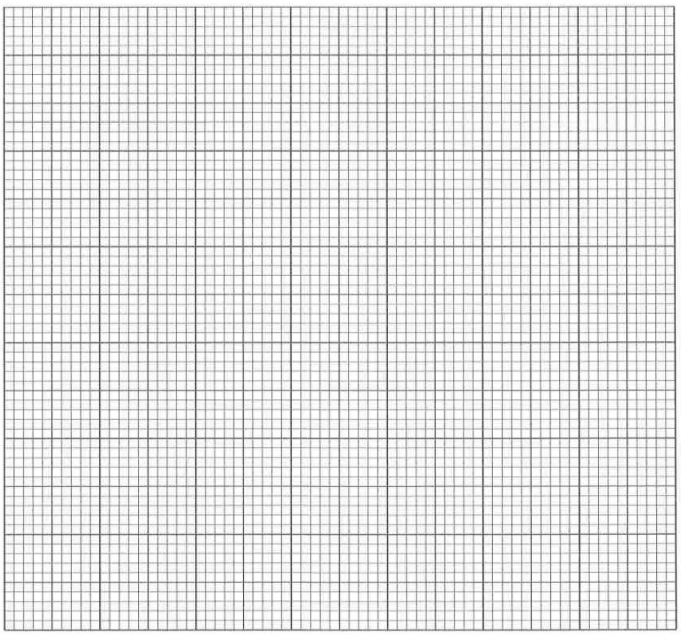
(b)



[4]

(c)
- Different microorganisms have different neucleotide sequences in their DNA. [1]
- The different nucleotide sequence code for different genes which under transcription and translation to form different polypeptides [1]
- which fold to form different protein which results in enzymes. [1]

6 (ai)



[4]

(aii) 12.5-6.8=5.7 [1]
(100/6.8) x 5.7= 83.8% [1]

(b) Loss of habitat of rainforest organisms that rely on other trees besides *H.brasiliensis* [1]
Loss of biodiversity [1]
Reduction of carbon sinks leading to global warming [1]

(c) Phloem [1]

7 (a) The basement membrane of the glomerulus is partially permeable allowing only small substances to pass through. [1]
The blood capillaries in the glomerulus are highly branched, increasing surface area to volume ratio for higher rate of diffusion of substances from the blood capillaries in the glomerulus into the Bowman's capsule. [1]
The walls of the Bowman's capsule are one cell thick which reduces diffusion distance and increases the rate of diffusion of substances from the blood capillaries in the glomerulus into the Bowman's capsule.[1]
Wider afferent arteriole than efferent arteriole creates hydrostatic pressure which provides a force to filter substances out of the blood into the Bowman's Capsule. [1]

(b) Greater volume[1]
Contain large substances that are now able to pass through the basement membrane.[1]

(ci) Homeostasis is the maintenance of a constant internal environment that is independent of the external environment.[1]
A process which ensures that the composition of the body fluid is kept within narrow limits.[1]

(cii) When blood water potential increases above the normal, the hypothalamus is stimulated and less ADH is released by the pituitary gland. This causes the collecting duct to be less permeable to water so less water is reabsorbed into the bloodstream and more water is excreted. [1]

8E (ai) The partition walls between alveoli have broken down.[1]
There are holes in the wall of the alveoli. [1]

(aii) When the partition walls between alveoli have broken down, it reduces surface area for gaseous exchange [1] which increases rate of breathing/ makes breathing difficult.[1]
The holes in the wall of the alveoli result in less oxygen being absorbed into blood capillaries and transported to body cells for respiration to release energy [1] which results in the person becoming tired easily [1].

(b) Health: This patient has a high risk of suffering from diabetes and coronary heart disease. [1]
Circulatory system: Without any exercise to breakdown the glucose and fat from his diet, the excess carbohydrate is converted to fat and with the fat from his diet, it can accumulate in the inner wall of blood vessels such as the coronary arteries. [1]
This narrows the lumen and less oxygen and glucose is transported to heart muscles for aerobic respiration to release energy for contraction.[1]
Over time, heart muscles may die and this may lead to a heart attack.[1]

8O (a) The lens changes its shape or thickness [1] which changes focal length[1] and refract light rays from an object and focus them sharply onto the retina.[1]

(bi) It blocks light rays from entering the centre of the eye [1]. So, light rays cannot be refracted accurately from an object onto the retina [1] and a blurr image is formed. [1]

(bii) Risk of developing cataracts:
- The study shows that, diabetes increases the risk of cataract as [1]
- there is a 42.9% chance of people having cataract if they are diabetic as compared to a 15.7% chance of having cataract if a person is not diabetic. [1]

Limitations:
- The total number of people in the study with diabetes and without diabetes is not equal. There are only 4613 people with diabetes in the study while the number of people without diabetes in the study is 45,387.[1]
- Hence, the results may be skewed and is not reliable as a fair test was not carried out. [1]