GCSE Mock Test 2023

77
100

Well done! Keep it up!

Subject: BIOLOGY
Board: AQA
Level: Paper 2 (Higher)

Student Name: _____

School: _____

Date: 4.5.23

Score: _____

Total Marks: 100

Time Allowed: 1 hour 45 minutes.

Instructions:

- Use black ink or black ball-point pen.
- Use a ruler and scientific calculator where needed.
- Answer **all** questions in the spaces provided.
- If you need extra space for your answer(s), please ask the invigilator for extra papers. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

NOTE

1. First and foremost, in any exam, attempt all questions without fail. Congratulations for attempting all questions!

2. Second, whenever you need to mention pointers, make sure you use numbers or bullets. You excelled in this area as well!

3. During the evaluation process, I have added some sentences to help you phrase your answer better. Please look over them to know how to incorporate statements to indicate your knowledge of the question. This will in turn fetch you more marks!

Overall, I would say you have a very strong grasp of the important concepts. Good luck!

Answer **all** the questions in the space provided.

0 1

Keeping a finger on flame triggers the reflex arc.

CNS ↑

R → SN → RN → MN → E → R

0 1 . 1

Mention the six steps that occur when a finger is kept on flame. **[6 Marks]**

1) Receptor detects change in stimulus, skin cells detect change in heat/temperature. ✓

2) ~~Receptor cells~~ Sensory neurone conveys electrical impulse from receptor. ✓ 6

3) Relay neurone receives signal from sensory neurone via ~~chemical junction~~ Synapse junction that uses chemical diffusion. (Relay neurone in CNS). ✓

4) Relay neurone conveys electrical response back to a motor neurone via synapse. ✓

0 1 . 2

In a synapse, a chemical signal is transmitted from which of the following? **[1 Mark]**

Tick(✓) the correct answer.

(i) Dendritic end of one neuron to the axonal end of another neuron ✓ ✗

X (ii) Axon to the cell body of the same neuron 0

X (iii) Cell body to the axonal end of the same neuron

(iv) Axonal end of one neuron to the dendritic end of another neuron

In a synapse, a chemical signal is transmitted from the axonal end of one neuron to the dendritic end of another neuron.

5) Motor neurone conveys electrical ~~resp~~ impulse to effector ~~muscle~~ ✓

Question 1 continues on the next page

6) Effector then responds. In this case it would be muscles the ~~muscles~~ in the ~~arm~~ moving ~~moving~~ away from the ~~it~~ flame. ✓ ~~the hand and arm~~ the hand and arm

1) The heat from the flame is the stimulus that is detected by pain receptors in the skin.

2) A sensory neuron then sends electrical impulses to the spinal cord which coordinates the message.

3) An electrical impulse is then passed to a relay neurone in the spinal cord.

0 1 . 3

Name the two types of cells present in the eye. **[2 Marks]**

~~the retina cells.~~

Cone cells and Rod cells ✓

2

0 1 . 4

What happens to the eye in dim light? **[3 Marks]**

In dim light, the circular muscles relax ✓ and radial muscles contract ✓ causing the pupil to dialate ✓ allowing more light to enter the eye due to lower levels of light. This allows for a better ~~image~~ vision

3

11

12

0 2 . 1

Fill in the blanks in the table given below. **[4 marks]**

Kidney filters blood and produces urine

Ureter carries urine from kidneys to the bladder

Structure	Function
Kidney	Break down excess proteins into urea
Ureter	the tube connecting bladder and urethra
Urinary bladder	Stores urine
Urethra	Where the urine is released from

0.5

1

0

1

0 2 . 2

In certain people, kidneys might stop working due to several reasons.
What happens to the body when kidneys stop functioning properly? **[2 marks]**

Buildup of toxins in the body as the ~~kidneys~~ kidneys are unable to properly break them down. Unregulated levels of mineral ions etc. Excess proteins not broken down into urea to be excreted

2

0 2 . 3

Explain what kidney dialysis is. **[2 marks]**

Kidney dialysis is a process of where a machine can clean the blood of a human similar to a kidney. Blood is cycled through the machine whilst diffusing and taking out excess toxins etc.

1

Kidney dialysis is an artificial method of filtering blood to remove toxins and excess substances from the body.
Patients are connected to a dialysis machine which acts as an artificial kidney to remove most of the urea and optimise the water and salt balance of the blood.

Dialysis fluid contains all the constituents of the plasma except urea. To be more specific, the answer should be mineral ions and glucose.

0 2 . 4

State the two components of dialysing fluid. **[2 marks]**

~~mineral ions. same concentration as a~~ Plasma

Mineral ions ✓ 1

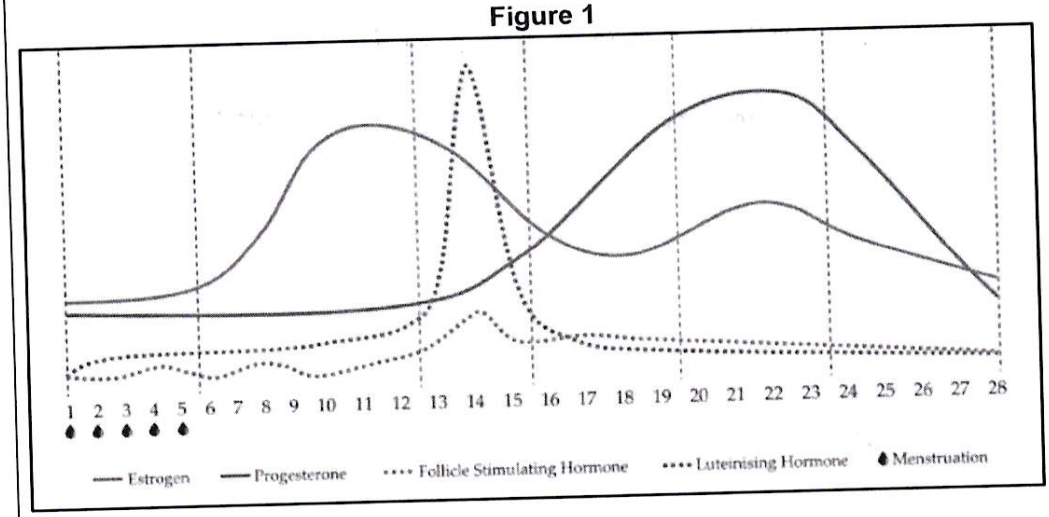
Plasma ✗ 0

6.5
10

0 3

The figure (Figure 1) given below shows the changes in hormone levels and other events in the menstrual cycle.

Figure 1



0 3 . 1

Identify the day when ovulation takes place describing the changes that occur. **[2 marks]**

Ovulation takes place ✓ on day 14 where FSH is ✗ at its highest. 1

During ovulation, the hormone LH (luteinising hormone) is at its peak. This hormone causes the release of the egg from its follicle in the ovary. and this process is known as ovularion.

Question 3 continues on the next page

Adrenaline is secreted in times of emergency in the body - it helps in increasing the heart rate, the breathing rate and thus increases the amount of oxygen available.

0 3 . 2

Give a reason to explain the following: **[2 marks]**

(i) Adrenaline is secreted in times of emergency

2

Adrenaline increases heart rate and ~~oxygen~~ breathing rate ~~breathing rate~~ needed for fight or flight response

(ii) Growth hormone should be released in optimum quantity only.

Too much of growth hormone in the body leads to gigantism and low quantities of growth hormone leads to dwarfism, thus it should be released in optimum quantity only.

Excess growth hormone can affect the functionality ~~on the bodies of systems~~ of systems that are in the body. Provides maximum effectiveness on body. Excess growth put stress on body to produce more protein etc.

0

0 3 . 3

Explain what a vasectomy is. **[1 mark]**

0.5

Vasectomy is when you ~~you~~ cut/~~sever~~ sever the tube that allows sperm to be ~~ejaculated~~ ejaculated. This prevents sperm from being released

Vasectomy is a surgical procedure that involves cutting or blocking the tubes that carry sperm from the testicles to the penis.

0 3 . 4

What does IVF stand for? **[1 mark]**

Tick(✓) the correct answer.

1

(i) In vitro fertilisation ✓

(ii) In vivo fertilisation

(iii) Invasive fertilisation

(iv) In vivo fertilisation

Question 3 continues on the next page

0 3 . 5

Mention the use of gibberellin and ethene in plants. [2 marks]

Ethene is used as to control the ripening of the ~~fruit~~ fruit. Gibberellins can be used for seed germination.

2

5.5

08

0 4

The antibiotic-resistant strain of Staphylococcus aureus is becoming increasingly prevalent in hospitals and other healthcare settings.

0 4 . 1

Explain how natural selection plays a role in the growth of this strain. **[2 marks]**

antibiotic - resistant strain performed best out of all the strains as it was able to thrive. This meant that it could replicate the most resulting in a greater population of this strand as compared to other strands which were not resistant as they would've died out.

2

0 4 . 2

What is the goal of developing new antibiotics and alternative treatments for Staphylococcus aureus? **[1 marks]**

Tick(✓) the correct answer.

(i) To increase the prevalence of bacteria in hospitals
(ii) To reduce the use of antibiotics
(iii) To improve infection control measures in hospitals
(iv) To treat infections more effectively ✓

1

0 4 . 3

How do mutations contribute to evolution? **[2 marks]**

Mutations can cause an organism to change so that it has a bad or good characteristic. If mutation results in an advantageous characteristic for its environment then it will thrive and reproduce more as compared to others. Overtime this is passed on resulting in the species evolving.

1

Question 4 continues on the next page

Mutations are random changes in an organism's DNA. Some mutations may result in new traits that are advantageous in a particular environment. These mutations then lead to gradual accumulation in a population and contribute to evolutionary change.

0 4 . 4 Homo habilis fossils are the first hominid fossils to show evidence of tool use.

What is the significance of the Homo habilis fossils? **[1 mark]**

Shows some ancestory of organisms that are from the same genus. Proves evolution and Natural selection. Allows us to compare features.

0

0 4 . 5

What kind of stone tools were used by early humans? **[2 marks]**

~~Stone tools like knives~~ Sharp stone tools were used ~~for~~ as knives. Round stone tools could be used for grinding food etc

2

0 4 . 6

Explain how the discovery of Lucy and Ardi contributed to our understanding of human evolution. **[2 marks]**

Lucy and Ardi were primative ~~ancestoral~~ humans (primates) ~~to~~ which allowed us to compare how humans have adapted in terms of ~~the~~ their characteristics.

0

6

10

Lucy's skeleton provided important evidence for the idea that hominins had evolved to walk upright on two legs.
Ardi's fossilised bones showed that hominins had adapted to living in forested environments.

Tissue culture is a process in which very small pieces of organisms known as tissues are grown using nutrient media in a laboratory space.

Sterile environment and optimum growth conditions

0 5

Tissue culture is used to grow plants in less space and short time.

0 5 . 1

What is tissue culture? **[1 mark]**

It is when the tissue is kept in ✗ optimal ~~conditions~~ to allow it to optimally function, ~~as it is~~

0

0 5 . 2

Name the four basic requirements needed for tissue culture. **[4 marks]**

1) Optimum temperature ✓
2) Optimum CO_2 levels
3) ~~Optimum~~ Maximise sunlight
4) ~~Soil PH and Soil pH and~~ Nutrients for growth e.g. Mineral ions & water ✓

2

0 5 . 3

How have dairy cows been selectively bred to produce higher quality milk? **[3 marks]**

Dairy cows that produce the highest milk quality are selected and then bred to produce off-spring ✓ that produce the ~~more~~ highest milk quality. This keeps happening selecting the best cows and ~~prevent~~ making sure that the lower quality cows produce less off-spring ✓. Over-time this results in a population where their are higher numbers of higher quality milk producing cows. ✓

3

5
08

0 6 . 1

How many base pairs are there in the human genome? **[1 mark]**

Tick(✓) the correct answer.

(i) 1 million
(ii) 1 billion
(iii) 10 billion ✓ ⊗
(iv) 100 billion

The human genome contains 1 billion base pairs.

0

0 6 . 2

Briefly explain what is a nucleotide. **[2 marks]**

A nucleotide is a specific molecule the produces a base code and is part of a sequence. Can determine certain characteristics ⊗

0

DNA is a polymer made from many repeating subunits called nucleotides. Each of these nucleotides consists of a common sugar and phosphate group with one of four different bases attached to the sugar base.

0 6 . 3

Name the process of conversion of DNA into mRNA. **[1 mark]**

Translation ⊗

0

Question 6 continues on the next page

0 6 . 4

Draw a Punnett square to show the offspring from a female homozygous dominant for a particular disease and a male homozygous recessive for the same disease.

same

f - DD M - dd ✓

[2 marks]

d - recessive
D - dominant

M

f

	D	D
d	Dd	Dd ✓
d	Dd	Dd

2

0 6 . 5

What would be the probability that the offspring shown in the Punnett square will have the disease?

[1 mark]

100% or 4/4

4/4 = 1/1 = 1 = 100%. ✓ or 1

1

Question 6 continues on the next page

Genotype is the combination of alleles that an individual possesses for a specific gene.
On the other hand, phenotype is the combination of the observable characteristics or traits depicted by an individual.

0 6 . 6

Describe the difference between phenotype and genotype. **[2 marks]**

Phenotype is the physical characteristics whereas genotype is the alleles that express it.

2

0 6 . 7

State three main conclusions derived from Mendel's work. **[3 marks]**

Mendel showed us that off-spring are dependant on the genes of their parents and that phenotypes are dependant on the alleles, for example recessive and dominant alleles. Shows the relations of the physical characteristics of off-spring and parent. Displayed how variation occurs among off-spring.

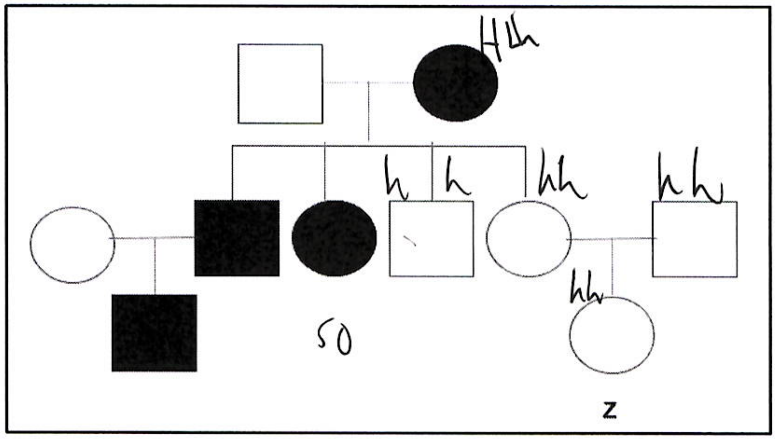
2

7
12

The offspring receives one 'hereditary unit' from each parent. Hereditary units can be dominant or recessive, where the dominant characteristic is always expressed when present.

0 7

Huntington's disease is a genetic disorder caused by a dominant allele (H). The pedigree given below shows the inheritance of Huntington's disease in a family.



M = Sqr
F = Circle
D = Sh

H H

0 7 . 1

State the genotype of the male present in the 1st generation. **[1 mark]**

hh ~~homozygous~~ homozygous recessive (hh).

1

0 7 . 2

A female with Huntington's disease could have one of two genotypes. State the two genotypes possible for a female with Huntington's disease. **[2 marks]**

homozygous dominant (HH) or

heterozygous (Hh).

2

	H	H
h	Hh	Hh
h	Hh	Hh

Question 7 continues on the next page

An individual that has the disease, has at least one dominant allele. Individuals without the disease will have two recessive alleles - hh.

0 7 . 3

Explain which Huntington's disease genotype the female in the 1st generation must be

[3 marks]

The female in first generation must be heterozygous (Hh) as only 50% of offspring are with the disease. As the father is homozygous recessive (hh), this must mean the mother is heterozygous (Hh)

½ of offspring have disease

	H	h
h	Hh	hh
h	Hh	hh

= 50%.

	H	h
h	Hh	hh
h	Hh	hh

= 100%.

∴ Mother must be Hh

F → 50% with Hh

2

0 7 . 4

What would be the genotype and the phenotype of the offspring Z?

[2 marks]

The genotype of offspring Z would be homozygous recessive (hh). The phenotype would be a female pedigree with no huntingon's disease.

2

0 7 . 5

Explain why the AB blood group in humans shows codominance.

[2 marks]

When two alleles of the same gene are expressed simultaneously it is known as codominance. In the ABO blood grouping in human blood, allele A and allele B are dominant over allele O and are expressed as AB when present together.

It is because both characteristics are commonly present and that not one is dominant over other. If one was only dominant then the other would be erased from the population over time. There would be a higher proportion of the more dominant one however they are equal so both are codominant.

1

8

10

An ecosystem is defined as the interaction of a community of living organisms - biotic components with the non-living abiotic components of their environment.

0 8

Animals in an ecosystem in certain cases compete for resources.

0 8 . 1

What is an ecosystem? **[1 mark]**

A ecosystem is an interdependant system comprised of abiotic and biotic components.

1

0 8 . 2

Mention any two major resources animals compete for in an ecosystem. **[4 marks]**

Animals compete for food and water. Compete for territory

Animals also compete for mates

3.5

0 8 . 3

Explain the three main levels of organisation of a food chain. **[3 marks]**

~~Prima~~ Producers are at the bottom of the food chain but detrimental. They are typically ~~plants~~ ~~photosynthetic~~ organisms that use photosynthesis to transfer energy. Primary consumers eat consumers as a food source to gain their energy. Secondary consumers eat primary consumers gaining their energy. Decomposers use breakdown (decay) biomass and recycle nutrients back into soil.

3

Question 8 continues on the next page

0 8 . 4

An eagle eats a mouse. Mention their respective levels of organisation in a food chain.

[2 marks]

Mouse would be typically ~~secondary~~ primary consumers. Eagle would be a secondary consumer.

2

9.5

10

0 9

Plants in deserts have adapted to the harsh conditions present there.

0 9 . 1

State any four adaptations that desert plants have to survive in hot and dry environments. **[4 marks]**

Desert plants have roots that go far and wide as water is scarce. The ~~great~~ great network of roots allows maximum water intake.

Desert plants often have waxy ~~cuticle~~ cuticle to limit water ~~loss~~. loss.

Desert plants have a ~~thick~~ thick outer layer and ~~often spines~~ often spikes to prevent predators from harming them.

Desert plants only bloom flowers when rainfall occurs to limit usage of water.

Leaves are reduced to spines to reduce transpiration al water loss

3.5

0 9 . 2

Name any two desert organisms that are well adapted to survive there. **[2 marks]**

Cactus

Camel

2

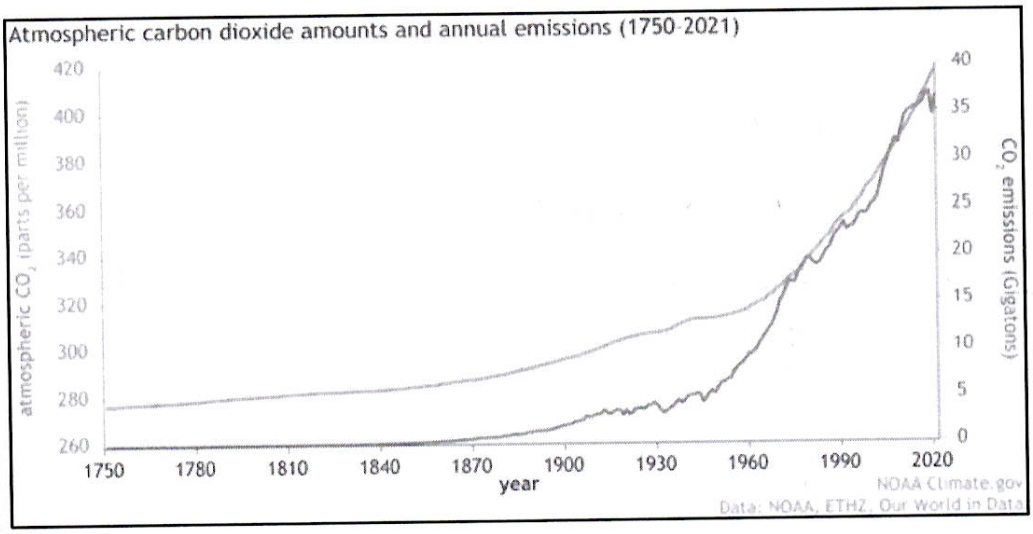
5.5

06

1 0

The graph (figure 2) given below shows the atmospheric carbon dioxide amounts and emissions every year.

Figure 2



1 0 . 1

Explain the general trend displayed in the graph. **[1 mark]**

As the years increase the concentration of CO_2 in atmosphere and emissions increase. ✓

1

1 0 . 2

Name any three activities that increase carbon dioxide emissions. **[3 marks]**

Deforestation ✓

Extraction / Process of metals → Industrial Processing ✓

Using Fossil-fueled cars ✓

3

Question 10 continues on the next page

To provide land for crop production
To provide fuel and paper
To provide land for human settlements
To provide land for quarrying

1 0 . 3

State any three reasons why deforestation is performed. **[3 marks]**

Deforestation occurs as wood is a valuable resource that can be used to make products. ✓
Land is cleared for housing and roads. ✓
Land is cleared for cattle ranching / farming. ✓

3

1 0 . 4

Soil erosion is one of the major consequences of deforestation. Explain what happens in soil erosion.

[4 marks]

Soil erosion also increases the chances of flooding since the top soil is now weakened.

When the tree is uprooted the tree roots are pulled out causing the integrity of the soil to decrease making it ✓ unstable. Lack of trees also means that there is no nutrients recycling ✓ and water is not absorbed. This causes a collapse in the ecosystem and results in ~~excess~~ harsh conditions for the soil causing it to inevitably become infertile. ✓

3

Question 10 continues on the next page

10.5 What do you think are three ways in which an individual can help in controlling global warming on a daily basis? **[3 marks]**

1) Minimise use of fossil-fueled cars ✓ Use more public transport

2) Heat the home less and don't waste electricity. ✓ Use electricity wisely

3) Recycle products and materials to limit the extraction of new materials and contributing to a more circular economy. ✓

3

13

14

male = square

female = circle

disease = shaded