



CHEMISTRY ONLINE
— **TUITION** —

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BIOLOGY

GENETIC BIODIVERSITY & CLASSIFICATION

Level & Board	AQA (A-LEVEL)
TOPIC:	GENETIC DIVERSITY & ADAPTION
PAPER TYPE:	SOLUTION - 1
TOTAL QUESTIONS	6
TOTAL MARKS	45

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Genetic Diversity and Adaptation - 1

1.

(a)

Different primary structure/amino acid sequence

Different tertiary structure/shape of active site

Enzyme-substrate complexes more likely (with enzyme from ADF allele)

(b) Researchers often start with a simple random sample. This allows them to statistically measure a subset of individuals selected from a larger group or population to approximate a response from the entire group.

(c) Flies with AD^f have selective advantage in presence of alcohol so insects with AD^f more likely to reproduce pass on AD^F allele. So, allele frequency increases.

(d) Directional selection

2.

(a) Histogram

Linear scale for y axis

Linear scale for x axis

Correct bar widths and touching

All bar heights plotted accurately

OR

Linear scale for y axis

Labelled bars of equal width and not touching

All bar heights plotted accurately

OR

Linear scale for y axis

All co-ordinates plotted accurately for frequency density

(b) $5000 \times 2 = 10000$

$0.5 \times 20000 = 10000 \times 2 = 20000$ babies

OR

$5000 = \text{no of babies} / 2.0$

$(5000 \times 2 = 10000) + (20000 \times 0.5 = 10,000) = 20,000$

Ans = 20,000 babies

(c)

- Survival increases as the birth mass increases
- Survival decreases with smoking
- Effect of smoking on number similar at all birth masses

3.

(a) Type of selection: Directional

Reason:

One extreme selected

One extreme allowed to breed

(b)

As a baseline/control

To show effect of no selection

OR

To show what happens in a normal population/naturally

OR

To show effect of / compare with tank A/tank C

(c) 1.6 to 1.7

(d) Not supported: Sea fishing reduces mean mass of fish because large fish removed. But (supported): Information from only one species. Fish in tanks are all the same age.

4.

(a)

Add 1 part bacteria culture to 9 parts sterile liquid (to make 10^{-1} dilution) mix well

Repeat using 9 parts fresh sterile liquid and 1 part of 10^{-1} and 10^{-2} dilutions to make 10^{-3} dilution

(b) 3,750,000,000

(c) unlikely to be accurate

too many cells

(d)

Tetracycline used more often / in higher doses;

Resistant bacteria more likely to survive and reproduce and pass on allele/gene for tetracycline resistance

OR

More / higher frequency of mutations for tetracycline resistance

Reject reference to mutation being caused by use of antibiotic so gene passed on to more bacteria

OR

Tetracycline used over longer time period

More time for chance mutation to occur / for selection to occur

(e)

- Bacteria with the previously advantageous mutation now aren't at an advantage or disadvantage
- Allele causing mutation isn't selected for or against, so rates remain stable
- Stabilizing selection

5.

(a)

- LP due to mutation OR Allele due to mutation
- Milk provides named nutrient glucose or galactose
- Individuals with LP more likely to survive and reproduce OR Individuals with advantageous allele more likely to survive and reproduce
- Directional selection
- Frequency of allele increases in the offspring/next generation

(b)

Dominant allele.

Always expressed when present in phenotype.

(c)

- Mutation in promoter region.
- Lactase gene continues to be transcribed.

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I am Sorry !!!!!



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- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
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