



**CHEMISTRY ONLINE**  
— **TUITION** —

Phone: +442081445350

[www.chemistryonlinetuition.com](http://www.chemistryonlinetuition.com)

Email: [asherrana@chemistryonlinetuition.com](mailto:asherrana@chemistryonlinetuition.com)

# BIOLOGY

## GENETICS, POPULATIONS, EVOLUTION & ECOSYSTEMS

Level & Board	AQA (A-LEVEL)
TOPIC:	POPULATIONS
PAPER TYPE:	SOLUTION - 1
TOTAL QUESTIONS	6
TOTAL MARKS	25

ChemistryOnlineTuition Ltd reserves the right to take legal action against any individual/ company/organization involved in copyright abuse.

## Populations - 1

1.

(a) 12/13

(b) 0.71

2.

(a)

No functional cones

Cones are connected to a single neuron

Cones Separate sets of impulses to brain

(b)

$(p^2 + q^2)$

42%

3.

(a)

A gene pool is the collection of genes within an interbreeding population at a particular time. As these genes can have different alleles, a gene pool can also be thought of as the sum of all the alleles of the genes of a population (of a single species) at a particular time.

4.

(a) P = Minus

Q = Plus

$P + Q = 1$

$P^2 + 2PQ + Q^2 = 1$

P = 0.2

Therefore  $Q = 1 - 0.2$

Q = 0.8

Therefore  $2PQ = 2 \times (0.2 \times 0.8)$

$2PQ = 0.32$

Answer = 0.32

**(b)**

Mutation produced KDR minus / resistance allele

DDT use provides selection pressure

Mosquitoes with KDR minus allele more likely (to survive) to reproduce

Leading to increase in KDR minus allele in population.

**5.**

**(a)** Codominance, in genetics, phenomenon in which two alleles (different versions of the same gene) are expressed to an equal degree within an organism. As a result, traits associated with each allele are displayed simultaneously.

**OR**

Both alleles are expressed / shown in the phenotype.

**(b)** Tortoiseshell coat color is normally restricted to female cats due to X-linkage of the gene that encodes the orange coat color

**OR**

Only possess one allele / Y chromosome does not carry allele / gene / can't be heterozygous.

**(c)**

$X^G X^B$ ,  $X^B X^B$ ,  $X^G Y$ ,  $X^B Y$

Tortoiseshell female, black female, ginger male, black male

(Ratio) 1:1:1:1

**6.**

**(a)**

P = dominant

Q = recessive

$$P + Q = 1$$

$$P^2 + 2PQ + Q^2 = 1$$

$$P^2 = 19\% = 0.19$$

$$\text{Therefore } Q^2 = 0.81$$

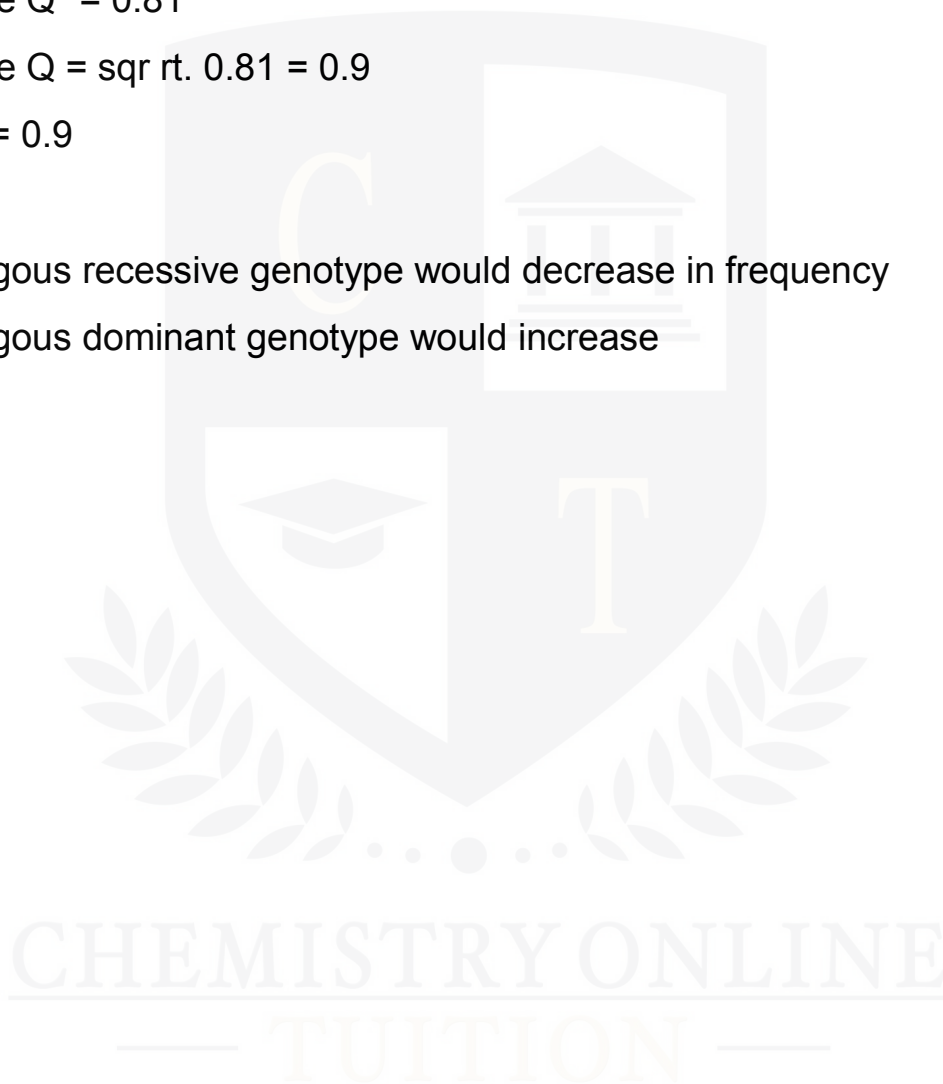
$$\text{Therefore } Q = \sqrt{0.81} = 0.9$$

$$\text{Answer} = 0.9$$

**(b)**

Homozygous recessive genotype would decrease in frequency

Homozygous dominant genotype would increase



I am Sorry !!!!!



**DR. ASHAR RANA**



**CHEMISTRY ONLINE**  
— TUITION —

Phone: +442081445350  
www.chemistryonlinetuition.com  
Email: asherrana@chemistryonlinetuition.com

- Founder & CEO of Chemistry Online Tuition Ltd.
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
- Chemistry, Physics, and Math's Tutor

---

## CONTACT INFORMATION FOR CHEMISTRY ONLINE TUITION

- UK Contact: 02081445350
- International Phone/WhatsApp: 00442081445350
- Website: [www.chemistryonlinetuition.com](http://www.chemistryonlinetuition.com)
- Email: [asherrana@chemistryonlinetuition.com](mailto:asherrana@chemistryonlinetuition.com)
- Address: 210-Old Brompton Road, London SW5 OBS, UK