



CHEMISTRY ONLINE
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BIOLOGY

GENETICS, POPULATIONS, EVOLUTION & ECOSYSTEMS

Level & Board	AQA (A-LEVEL)
TOPIC:	POPULATIONS
PAPER TYPE:	SOLUTION - 2
TOTAL QUESTIONS	6
TOTAL MARKS	25

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Populations - 2

1.

(a) In insects, DDT opens voltage-sensitive sodium ion channels in neurons, causing them to fire spontaneously, which leads to spasms and eventual death.

OR

Neurons remain depolarized

So no action potentials / no impulse transmission.

(b) Mutation changes shape of sodium ion channel (protein) / of receptor protein

DDT no longer complementary / no longer able to bind.

OR

Mutation changes the shape of the sodium ion channel so DDT is no longer complementary. Doctors investigated the relative effects of genetics and environmental factors on the development of schizophrenia

2.

(a) Y chromosome does not carry a dominant allele so recessive allele is always expressed in females whilst males could have dominant and recessive alleles.

OR

Recessive allele is always expressed in females / females have one recessive allele / males need two recessive alleles / males need to be homozygous recessive / males could have dominant and recessive alleles / be heterozygous / carriers

3.

(a) 1, 2 and 5

1 must possess / pass on the recessive allele / 1 must be a carrier / heterozygous / if slow (feather production) is recessive all offspring of (1 and

2) would be slow (feather production) / if rapid (feather production) was dominant 1 would have rapid feather production

OR

One (XX male) and Two (XY female) are slow feather but 5 (XY female) is rapid

So One (XX male) must be heterozygous - > if rapid was dominant One would have rapid feather production

(b)

5 = $X^fY / X^fY - / f / f - / fY$

7 = X^FX^f and X^FX^F either way round

(c) X^FX^f and X^fY or X^FX^F and X^fY

4.

(a) 32 %

5.

(a) It helps in determining how efficiently a firm or an organisation is operating. It provides significant information to users of accounting information regarding the performance of the business. It helps in comparison of two or more firms.

OR

Allows (valid) comparison

Number / sample size may vary

(b) Increased chance of severe malaria with blood group A / decreased chance of severe malaria with sickle cell

Almost equal chance with blood group O / slightly greater chance of mild malaria with O / slightly lower chance of severe malaria with O / 2.5 x / 2.48 x / more than twice the chance of severe with blood group A / (almost) 50% / half the chance of severe malaria with sickle cell / twice the chance of mild malaria with sickle cell

(c)

Individuals with the Hb^C (allele) reproduce

Pass on Hb^C (allele) which increases in frequency

Hb^A Hb^A individuals less likely to survive / reproduce / frequency of Hb^A allele decreases

6.

(a)

$$1/400 = 0.0025$$

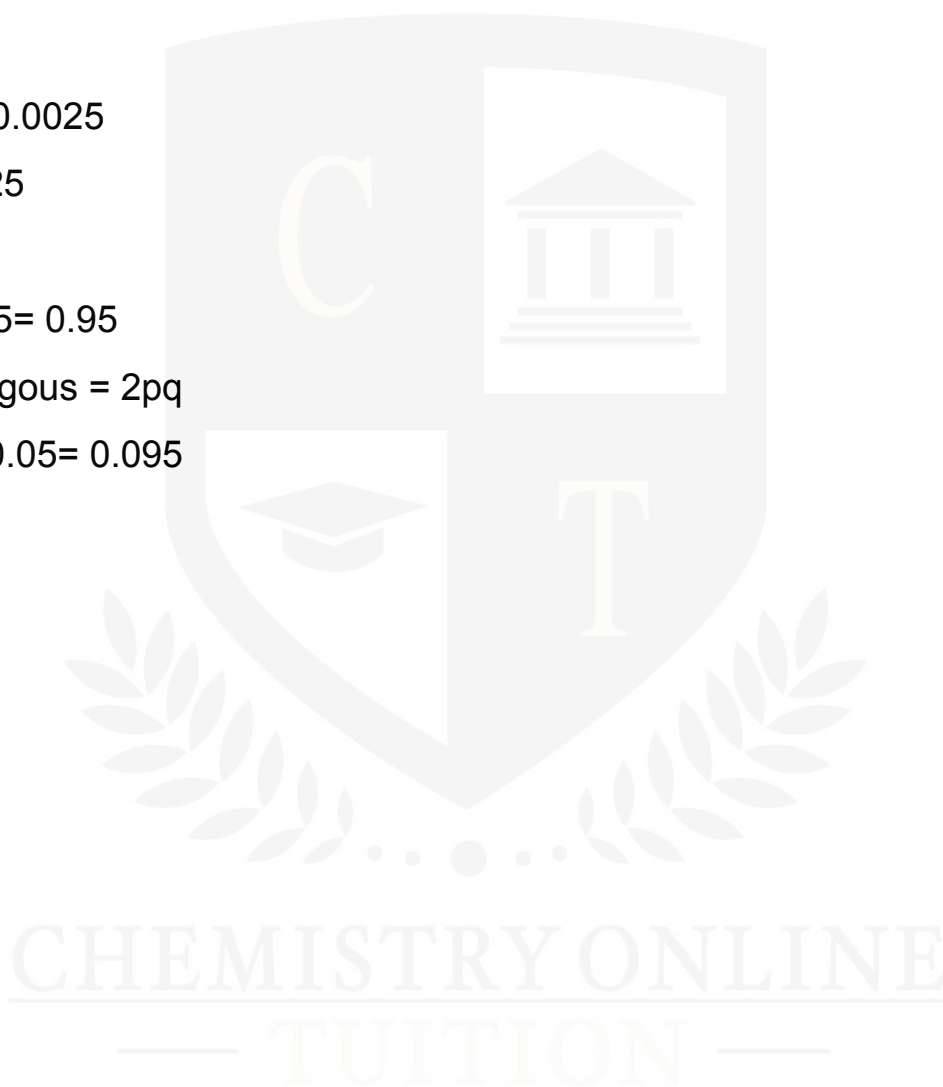
$$q^2 = 0.0025$$

$$q = 0.05$$

$$p = 1 - 0.05 = 0.95$$

$$\text{heterozygous} = 2pq$$

$$2 \times 0.95 \times 0.05 = 0.095$$



I am Sorry !!!!!



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