CHEMISTRY ONLINE TUITION

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BIOLOGY

INHERITANCE AND HARDY-WEINBERG PRINCIPLE

Level & Board	AQA (A-LEVEL)
TOPIC:	INHERITANCE AND HARDY
PAPER TYPE:	SOLUTION - 1
TOTAL QUESTIONS	6
TOTAL MARKS	34

Inheritance and Hardy-Weinberg Principle - 1

1.

(a) In fruit flies, males have the sex chromosomes XY and the females have XX. In fruit flies, a gene for eye colour is carried on the X chromosome. The allele for red eyes, R, is dominant to the allele for white eyes, r. (a) Male fruit flies are more likely than female fruit flies to have white eyes.

OR

Males have one allele

Females need two recessive alleles

(b) Box B

All females red-eyed, all males white-eyed

(c)

The two genes are linked

No crossing over occurs

No Gl and no gL gametes produced

(d) 8×10^{10}

2.

(a) Genetic variation can be caused by mutation (which can create entirely new alleles in a population), random mating, random fertilization, and recombination between homologous chromosomes during meiosis (which reshuffles alleles within an organism offspring

OR

Crossing over

Independent segregation/assortment of homologous chromosomes

Random fusion of gametes

(b) Codominance

(c)

ttC^RC^W and TtC^WC^W

TtC^RC^W, TtC^WC^W, ttC^RC^W and ttC^WC^W

Tall pink, tall white, dwarf pink, dwarf white, and ratio 1 : 1 : 1 : 1

3.

(a) 9% = 0.09 = P2

P=0.3

P+q= 1 q=0.7

P2 + 2pq + q2 = 1

2 X 0.3 X 0.7 = 0.42

OR

42%

2pq = heterozygous

1 - (p2 + q2)

4.

(a)

Genotype: GgX^RX^r

(b) If it was recessive all files of 3 and 4 would be grey

OR

Flies 3 and 4 produce 9- two grey bodies produce one black body.

(c)

Fly 3 and 4 produce 9

Fly 3 would pass dominant allele to 9

OR

Fly 3 and 4 produce 9.

5.

(a) GgX^rX^r and ggX^RY

GgX^RX^r, ggX^RX^r, GgX^rY and ggX^rY

Grey-bodied red-eyed female, black-bodied

red-eyed female, grey-bodied white-eyed

male, black-bodied white-eyed male and ratio

1 : 1 : 1 : 1

(b)

grey body = GG or Gg

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

$P^2 + 2PQ = 0.64$

$0.64 + Q^2 = 1$

1-0.64 = 0.36 so P = 0.6

P + Q = 1

1-0.6 = 0.4

0.4 x 0.6 x 2 x100 = 48%

6.

(a)

Small sample used

Crossing over

Random fertilization

(b) ttmm

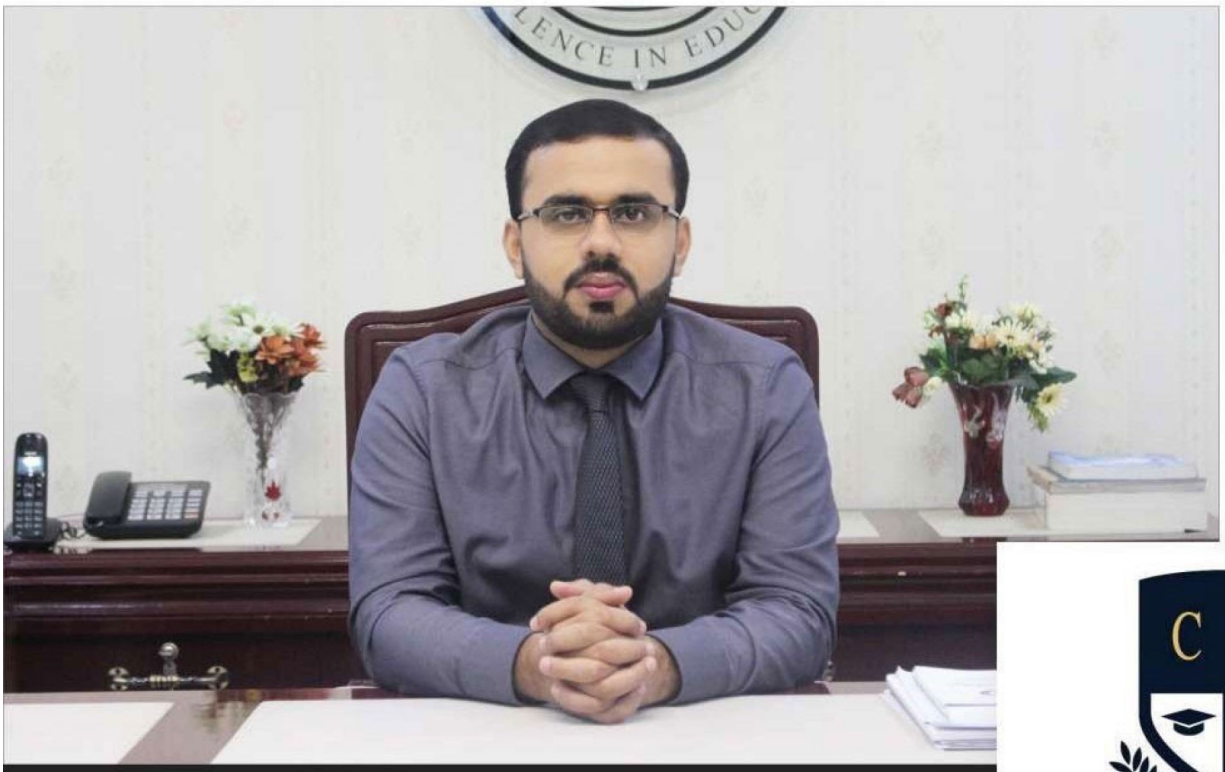
(c)

The genes are linked, which produces fewer tall, mottled and dwarf, normal offspring, crossing over has occurred.

(d)

Phenotype of offspring	Ratio of offspring
Tall (plant and) normal (leaves)	9
Tall (plant and) mottled (leaves)	3
Dwarf (plant and) normal (leaves)	3
Dwarf (plant and) mottled (leaves)	1

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
- Chemistry, Physics, Math's and Biology Tutor

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