10.2 Inheritance

Question Paper

Course	DP IB Biology
Section	10. Genetics & Evolution (HL Only)
Topic	10.2 Inheritance
Difficulty	Hard

Time allowed: 10

Score: /5

Percentage: /100

Question 1

In rabbits, brown coat is dominant to black coat and long ears are dominant to short ears. Two rabbits are heterozygous for both characteristics.

What is the probability that their first offspring will have black coats and short ears?

    A. 0

    B. 1/16

    C. 4/16

    D. 9/16

[1 mark]

Question 2

Which of the following processes results in the production of recombinants?

    I. Crossing over of bivalents
    II. Independent assortment during meiosis I
    III. Independent assortment during meiosis II
    IV. Mutation

  A. I only

  B. I and II only

  C. I, II and III only

  D. I, II, III and IV.

[1 mark]

Question 3

The inheritance pattern of two separate genes was investigated in a double-heterozygous cross in domestic cats (*Felis catus*). A chi-squared test of phenotypic ratios of the two separate genes results in a χ^2 value of 7.96.

The table below shows the critical values of the chi squared distribution.

Degrees of freedom	Probability that the difference between observed and expected results is due to chance			
	0.1	0.05	0.01	0.001
1	2.71	3.84	6.64	10.83
2	4.60	5.99	9.21	13.82
3	6.25	7.82	11.34	16.27
4	7.78	9.49	13.28	18.46

Which row of the table best describes a conclusion that can be drawn from this data?

	Probability that the results are due to chance (High / Low)	Are the two genes linked? (Yes/No)
A	Low	Yes
B	Low	No
C	High	Yes
D	High	No

[1 mark]

Question 4

In a breeding experiment, a tall, round seeded (homozygous dominant) pea plant was crossed with a short, wrinkled seeded (homozygous recessive) pea plant. The F_1 dihybrid plants were then used in a test cross.

If the genes are always linked and no crossing over occurs, what would be the predicted ratio in the F_2 generation?

    A. 9 : 3 : 3 : 1

    B. 1 : 1 : 1 : 1

    C. 3 : 1

    D. 1 : 1

[1 mark]

Question 5

In a variety of roses, **P** is the allele for pink petal colour and **D** is the allele for double flower.

Which cross will give a 1:1:1:1 ratio of phenotypes in the offspring?

   A. PpDd x ppDd

   B. PpDd x PpDd

   C. PPdd x ppDD

   D. Ppdd x ppDd

[1 mark]