

GCSE Biology
Double Award Higher Level
Module B4: Topic 3
DNA and Inheritance
Mark Scheme

1. B2 S 2012 (H)

(a)	Bases.	1
(b)	Amino acids.	1
(c)	7	2
(d)	Double helix.	1
(e)	Enzymes / hormones	1
Question total		[5]

2. B1W 2014 (H) (Q9)

Collect the blood from the {gut/digestive system/stomach} of leeches/collect the ingested blood; 3
Compare {genetic/DNA} profiles with the {known/stored} {genetic/DNA} profiles;
{A correct match/if they are the same} shows the endangered species exist;
3rd point is linked to 2nd point

3. B1W 2014 (H) (Q5)

(a) {the genes/all the alleles} in {an organism/dog/it}/
 the {set/pair/two/both} alleles that {determine/control} {a
 characteristic/colour} of the dog/
 the genetic make-up of {an organism/dog}; 1

(b) (i) {Cross/mate/breed} {the (black) Labrador/ it} with {a yellow
 Labrador/bb}/do a test cross; 3
 If all the {puppies/litter} are black then {the (black) Labrador/
 it} is {homozygous/BB};
 If there are yellow puppies in the litter then {the (black)
 Labrador/ it} is {heterozygous/Bb};

(ii) 1 mark for each correct Punnett square;; 2

Gametes	B	B
b	Bb	Bb
b	Bb	Bb

Gametes	B	b
b	Bb	b
b	Bb	b

Alternative marking option

(b) (i) {Cross/mate/breed} the black Labrador with another Black
 Labrador which is known to be {heterozygous/Bb}; 3
 If all the puppies are black then the black Labrador is
 {homozygous/BB};
 If there are some yellow puppies in the litter then the
 black Labrador is {heterozygous/Bb};

(ii) 1 mark for each correct Punnett square; 2

Gametes	B	B
B	BB	BB
b	Bb	Bb

Gametes	B	b
B	BB	Bb
b	Bb	bb

If bi not completed then first marking option must be used for marking punnett squares

4. B1W 2015 (H) (7)

(a)	<i>Penaeus japonicus</i> ; Correct spelling and format	1
(b)	<i>Penaeus kerathurus</i> ; Correct spelling and format	2
	The {DNA/genetic} profile is <u>most</u> similar to the unknown species/ both are in the same genus/both have the same first {scientific/latin} name/ <u>most similar DNA banding pattern</u> ; NOT genetic fingerprint/ genotypes/genus	
(c)	They use the same name of genus and species/same {scientific/universal/Latin/international/binomial} name/scientific name is universal;	1
	Question 7 total	[4]

5. B1S 2012 (H) (Q1)

- (a) (i) I DD II dd; Allow e.c.f from (a)(i) 1
- (ii) Gametes correct; 1
- Cross correct; 1

F1	Gametes	D	D
	d	Dd	Dd
	d	Dd	Dd

- (b) (i) Allow e.c.f from (a)(ii) 1
- Gametes correct; 1
- Cross correct (mark independently of gametes); 1

Gametes	D	d
D	DD	Dd
d	Dd	dd

- (ii) Answer from candidate's Punnett square

1 homozygous dominant : 2 heterozygous : 1 recessive; 1

NOT 25:50:25/ 2:4:2/ ¼: ½: ¼

6. B1S2012 (H) (Q7)

(a)	D C B A ;;;	3
	3/ 4 correct = 3 marks	
	2 correct = 2 marks	
	1 correct = 1 mark	
(b)	To understand the possible effects on environment / health (safe to eat)/ health problems/ to check there is no transfer of genes to other species; NOT to see if genetic modification is successful	1
	Question total	[4]

7. B2 S 2013 (H) (Q9)

Marking details

Marks Available

Indicative content

Two chains of alternating sugar and phosphate molecules connected by bases. The chains are twisted to form a double helix. There are 4 bases: adenine, thymine, cytosine and guanine. Base pairing occurs between A and T; C and G. Triplet codes determine types of amino acids. The order of amino acids will determine the particular protein produced.

5-6 marks

The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.

3-4 marks

The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.

1-2 marks

The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.

0 marks

The candidate does not make any attempt or give a relevant answer worthy of credit.

Question 9 Total

[6]