

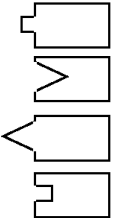
WJEC (Eduqas) Biology GCSE  
Topic 7.1 The Genome and Gene  
Expression  
Questions by Topic - Mark  
Scheme

1.	Question	Marking details	Marks Available
	(a)	Nucleus; Gene; Protein;	3
	(b) (i)	I 8;	1
		II Kangaroo; (8 is/ gametes have) {half the body cell number/ half the diploid number}/ 8 is the haploid number/ {reference to fertilisation restoring the body cell chromosome number/OWTTE}; NOT half the number of chromosome 2 <sup>nd</sup> mark only accessed if 1 <sup>st</sup> mark credited	2

2.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a) (i)	1	10;	5 pairs		
	(b) (i)	1	nucleus;			
	(ii)	1	DNA;			
	(iii)	1	protein;			
	(c)	1	Ionising/ UV;			
		9				

3.	Question	Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
	(a) (i)	chromosomes	1			1		
	(ii)	DNA	1			1		

4.	Question	Marking details	Marks Available
	4 (a)	Nucleus;	1
	(b) (i)	Sugar and phosphate;	1
	(ii)	A with T and G with C;	1
	(iii)	Double helix;	1
	(c)	Amino acids + Proteins;	1
	<b>Question 4 Total</b>		<b>[5]</b>

5.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a) i	2	 <p>Each shape needs an oblong + an indentation or a protrusion.  4 shapes correct = 2 marks  3 shapes correct = 1 mark  0/1/2 shapes correct = 0 marks</p>			
	ii	2	Cytosine Adenine Thymine Guanine <b>Spelling must be correct</b> 4 names correct = 2 marks 3 names correct = 1 mark 0/1/2 names correct = 0 marks			
	(b)	2	Three bases form a <u>code</u> / a triplet <u>code</u> ; (Code) determines the {order/ sequence} of the amino acids;			
6.	Total Mark	6				

Question	Marking details	Marks Available
(b)	TAGACATGTC	1
(c)	3	1
<b>Question 6 Total</b>		<b>[4]</b>

7.		Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	i		1	Double helix;			
	ii		2	T,G,C 3 correct = 2 marks 2 correct = 1 mark 0/1 correct = 0 marks			
(b)			1	Proteins <b>and</b> amino acids;			
Total Mark			4				

8.	Question	Marking details	Marks Available
(a)	(i)	Bases;	1
	(ii)	T and C in correct positions;	1
(b)	(i)	Nucleus; Accept chromosome	1
	(ii)	Twisted/ helix; NOT coil	1
<b>Question 8 Total</b>			<b>[4]</b>

9.	Question	Marking details	Marks Available
	(a)	B;	1
	(b)	Phosphate and sugar; (either order)  Bases;  Helix;	3
	(c)	Code (for amino acids);  NOT 'code for life'	1
<b>Question 9 Total</b>			<b>[5]</b>

10.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a) (i)	2	ACAAT;; 5 correct = 2 marks 4 correct = 1 mark 0/1/2/3 correct = 0 marks			
	(ii)	1	Phosphate;			
	(b) (i)	1	Amino acid;			
	(ii)	2	(form a) <u>code</u> ; (determining){order/sequence} of amino acid/ decides which amino acid (goes where)/ decides the type of amino acid;			
	Total Mark	6				

11.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a)	1	Nucleus/ mitochondria;			
	(b)	1	A always matches to T <b>and</b> C always matches to G;	Pairs with/ bonds with/ complementary base pairs with	Incorrect spelling of bases	Goes with/
	(c) (i)	1	Mitosis (correct spelling)			

12.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	1	28.6 = thymine <b>and</b> 21.4 = cytosine for 1 mark			
(b)	2	A = 200 = 2 marks 400 = 2 marks			
Total Mark	3				

13.

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
13	<p><b>Indicative content:</b></p> <ul style="list-style-type: none"> <li>• Two long chains</li> <li>• alternating sugar and phosphate</li> <li>• connected by bases</li> <li>• (twisted to form) double helix</li> <li>• four types of bases/ Adenine, thymine, cytosine, guanine</li> <li>• complementary base pairing/ A -T; C - G</li> <li>• order of bases forms a code for making proteins</li> <li>• each triplet code identifies a particular amino acid</li> <li>• amino acids are linked together to form proteins.</li> </ul> <p><b>5-6 marks</b> At least 7 points from indicative content <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</i></p> <p><b>3-4 marks</b> At least 4 points from indicative content <i>There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</i></p>	6			6		
	<p><b>1-2 marks</b></p> <ul style="list-style-type: none"> <li>• Two long chains</li> <li>• connected by bases</li> <li>• double helix</li> <li>• four types of bases</li> </ul> <p>At least 1 points from indicative content <i>There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</i></p> <p><b>0 marks:</b> No attempt made or no response worthy of credit.</p>						
	<b>Question 13 Total</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>

14.	Question	Marking details	Marks Available
8	(a)	(i) Adenine Thymine Cytosine Guanine -1 for each error	2
		(ii) Amino acids;	1

15.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)		2	Ratio of A:T approximately equal; Ratio of G:C approximately equal;	Similar masses/ similar ratio		Similar results/ numbers/ amount

16.	Question			Marking details	Marks available					
	(a)	(i)			AO1	AO2	AO3	Total	Maths	Prac
16	(a)	(i)		sugar and phosphate	1			1		
		(ii)		A, C (1) T and A (1)		2		2		
		(iii)		(The order of the bases) form a <u>code</u> (1) For the amino acids (1)	2			2		
	(b)	(i)		Suspect 3 has same {bands as profile/ DNA profile/ profile/ DNA}			1	1		
		(ii)		Establishing paternity/ family relationships/ classification	1			1		
		(iii)		Issues of privacy/ ownership		1		1		
				<b>Question 16 Total</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>8</b>	<b>0</b>	<b>0</b>

**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 17 Total****[6]**



18.

Question		Marking details	Marks Available									
18	(a)	(i) One {form/version/variant} of <u>a</u> gene/{two/different}{forms/types/versions} of {the <u>same/a</u> } gene;	1									
		(b) (i) Gametes correct (must use correct letter for this mark); Mechanics of cross correct; Allow ECF of incorrect gametes but must use B/b	2									
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Gametes</td> <td><b>B</b></td> <td><b>b</b></td> </tr> <tr> <td><b>B</b></td> <td><b>BB</b></td> <td><b>Bb</b></td> </tr> <tr> <td><b>b</b></td> <td><b>Bb</b></td> <td><b>bb</b></td> </tr> </table>		Gametes	<b>B</b>	<b>b</b>	<b>B</b>	<b>BB</b>	<b>Bb</b>	<b>b</b>	<b>Bb</b>	<b>bb</b>	
	Gametes	<b>B</b>	<b>b</b>									
	<b>B</b>	<b>BB</b>	<b>Bb</b>									
<b>b</b>	<b>Bb</b>	<b>bb</b>										
(ii) 75%/ 0.75/ ¾/ 3 in 4; NOT ratio	1											
(iii) 3 : 1 ;	1											
<b>Question 18 Total</b>			<b>[6]</b>									

19.	Question	Marking details	Marks Available
	(a)	The analysis of the DNA of an organism/ looking at the {patterns/ bands} in <u>DNA</u> ;	[1]
	(b)	Any 2 from : <u>{Identifying/ finding out who is}</u> the {culprit/ suspect} from evidence at a crime scene/ or example; NOT solving crimes/ catching criminals {Paternity/ maternity} testing/ finding out who the {father/ mother} is/ identify relatives; Comparison between species for classification purposes; Identification of genes associated with an {inherited disease/ named inherited disease}/ to find out if parents may have children with cystic fibrotic disease/ determine risk of developing breast cancer; Identification of dead bodies;	[2]
		<b>Question Total</b>	<b>[3]</b>

20.	Question	Marking details	Marks Available
	(c)	(i) {Genetic/ DNA} {profile/ profiling}; NOT genetic fingerprinting	1
		(ii) DNA {has coded information/ codes for protein}; Baby's DNA is different to Mike's/ In the {DNA profiles/ genetic analysis} above, the baby {does not have any (base) A/ has one less G};	2

21.

Question	Marking details	Marks Available
6 (a)	(i) DNA;	1
	(ii) Genes/ alleles;	1

22.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
ii	1	genetic profile /DNA profiling;			Fingerprinting
(c)	2	Red panda and giant panda are in different families;  Red panda and racoon share <u>more recent</u> common ancestor;	Red panda and racoon are in the same family		
Total Mark	6				

23.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(b)	1	{Genetic/ DNA/ gene} <u>profiling</u> ;			Genetic analysis/ DNA testing/ chromosome profiling/ genetic fingerprinting

24.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a) i	1	DNA;			