

Inheritance

Mark Scheme 3

Level	IGCSE(9-1)
Subject	Biology
Exam Board	Edexcel IGCSE
Module	Double Award (Paper 1B)
Topic	Reproduction and Inheritance
Sub-Topic	Inheritance
Booklet	Mark Scheme 3

Time Allowed: 46 minutes

Score: /38

Percentage: /100

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>90%	80%	70%	60%	50%	40%	30%	20%	10%

Question number	Answer			Notes	Marks												
1 (a)	<table border="1"> <thead> <tr> <th>genotype</th> <th>description of genotype</th> <th>phenotype</th> </tr> </thead> <tbody> <tr> <td>(LL)</td> <td>(homozygous dominant)</td> <td>long winged</td> </tr> <tr> <td>(LI)</td> <td>(heterozygous)</td> <td>long winged;</td> </tr> <tr> <td>ll;</td> <td><u>homozygous</u> <u>recessive;</u></td> <td>(short winged)</td> </tr> </tbody> </table>			genotype	description of genotype	phenotype	(LL)	(homozygous dominant)	long winged	(LI)	(heterozygous)	long winged;	ll;	<u>homozygous</u> <u>recessive;</u>	(short winged)	long winged x 2 = 1 mark	3
genotype	description of genotype	phenotype															
(LL)	(homozygous dominant)	long winged															
(LI)	(heterozygous)	long winged;															
ll;	<u>homozygous</u> <u>recessive;</u>	(short winged)															
(b)	<table border="1"> <thead> <tr> <th>number</th> <th>tick</th> </tr> </thead> <tbody> <tr> <td>204</td> <td></td> </tr> <tr> <td>408</td> <td>✓</td> </tr> <tr> <td>612</td> <td></td> </tr> <tr> <td>816</td> <td></td> </tr> </tbody> </table>			number	tick	204		408	✓	612		816		more than one tick = 0	1		
number	tick																
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Question number	Answer	Notes	Marks
1 (c)	<u>fruit</u> → <u>yeast</u> → <u>flies</u> ; arrows used and correct;	yeast in middle =1	2
(d) (i)	type of fruit / eq; mass/amount of fruit / eq; gender / species / type / size of fly; temperature; light; humidity;	ignore number of flies / time	max 2
(ii)	(no) not repeated / only done once / use more flies / eq; (yes) used lots of flies;		1
		Total	9

Question number	Answer	Notes	Marks	
2 (a)	1 ZZ 2 Z 3 ZZ 4 male	ZW; (gender must be clear) Z (and) W; ZW; female;	X and Y alone = 0 allow 2 and 3 in Punnett square and 1 and 4 if labelled	4
(b) (i)	protein;	ignore calcium ignore vitamins	2	
(ii)	amino acids / muscles / bone / enzymes / cells / tissues / eq;		Max 1	
(iii)	fats / lipids / cholesterol / (named) carbohydrate; energy / cell membrane; respiration; (less) dehydration / eq; protection / less chance of breaking / prevents cracking / eq; cheese / fish / eggs / milk / low-fat spreads / yoghurt / liver / carrots / sweet potatoes / eq; immunity / vision (in dim light) / healthy skin / bone <u>metabolism</u> / gene transcription / embryo development / eq;		2	
(c)	meiosis; gametes / sex cells / sperm <u>and</u> egg; haploid / n / half / 23; fertilization / fuse / combine / join / eq; diploid / 2n / full set / 46;		Max 3	
		Total	12	

Question number	Answer	Notes	Marks
3 (a) (i)	<p>parents: Aa Aa;</p> <p>gametes: A a A a;</p> <p>offspring: AA Aa Aa aa;</p> <p>phenotypes: short short short average;</p>	<p>allow parent, gamete and offspring marks in Punnett square</p> <p>if parent genotypes wrong allow ecf to max of 3 for gametes, offspring and phenotypes</p> <p>allow if other symbols used</p> <p>allow other terms for short and average eg achondroplasia and tall</p> <p>only give phenotype mark if it is clear that candidate knows there are three short and one average a statement that the phenotypes are short and average = 0</p>	4
(b)	$\frac{1}{4}$ / 25% / 0.25 / 1 in 4 / eq;	ecf	1

Question number	Answer	Notes	Marks
3 (c) (i)	always / in heterozygote / in both heterozygote and homozygote / eq; expressed / seen / shown / determines characteristic / develops the trait / (in phenotype) / eq;	ignore stronger / overpowers / masks	Max 2
(ii)	1. those with achondroplasia less likely to have children / reproduce / eq; 2. allele is rare / eq; 3. selective advantage for aa / eq;	allow converse for all points allow health implications for achondroplasia	Max 2

Total 9 marks

Question number	Answer	Notes	Marks												
4 (a)	<table border="1"> <thead> <tr> <th>Order</th> <th>Name of stage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>gametes;</td> </tr> <tr> <td>2</td> <td>zygote</td> </tr> <tr> <td>3</td> <td>embryo</td> </tr> <tr> <td>4</td> <td>foetus;;</td> </tr> <tr> <td>5</td> <td>baby</td> </tr> </tbody> </table>	Order	Name of stage	1	gametes;	2	zygote	3	embryo	4	foetus;;	5	baby	<p>1 mark for gametes</p> <p>1 mark for baby</p> <p>2 marks for zef</p> <p>1 mark for zfe or ezf or fez</p>	4
Order	Name of stage														
1	gametes;														
2	zygote														
3	embryo														
4	foetus;;														
5	baby														
(b) (i)	connection between <u>atria</u> / eq; connection between arteries / pulmonary artery and aorta;		2												
(c) (i)	XY;		1												
(ii)	46 or 23 <u>pairs</u>		1												

TOTAL 8 MARKS