Question number	Answer	Notes	Marks
1 (a)	1. (section of) DNA; 2. (codes) for a protein / polypeptide;	Ignore codes for characteristic	2
(b) (i)	guanine;	Allow phonetic spelling eg gwanine = 1	1
(ii)	420;		1
(c) (i)			1
(ii)	0.5 / ½ / 50% / 2 in 4 / eq;		1
			Total 6 Marks

(c) (i)

Chicken	Genotype
parent with all black feathers	$C^B C^B$ / BB
parent with all white feathers	$C^W C^W$ / WW
offspring with a mixture of black and white feathers	$C^B C^W$ / BW;

Question number	Answer	Notes	Marks
2(a)	TT and tt;	accept symbols other that T or t eg P and p	1
	T and t;		1
	Tt;	parent mark can only be awarded if dominant and recessive letters are the same eg TT and tt or AA and aa	1
	correct Punnett square = 3		
		TT and DD = 0	
		allow transfer error (TE) for gametes and offspring	
		if parent genotype wrong allow TE for gametes and offspring	
(b) (i)	stop <u>cross-pollination</u> / stop cross-pollination described / pollen from one plant getting to different plant / eq;		max 2
	Mendel did it himself / manual pollination / use brush / pollen from plant to (stigma) of plant / self-pollination described / eq;		
	isolate plants (in greenhouse) / keep plants apart / cover plant / keep insects/wind away; eq;	allow isolation idea if applied to group of plants	
(ii)	TT, Tt (Tt) and tt;	reject combinations of different letters eg T and D or T and d or T and S	1
	accept symbols other that T or t eg P and p		

	Question number	Answer	Notes	Marks
2	(c)	T / always expressed / expressed in heterozygote / expressed in homozygote and heterozygote / always shown in phenotype / eq;	reject dominates over recessive	1
	(d)	both / two alleles / equal / eq; reject if reference to genes expressed / contribute / shown / eq; in heterozygote / phenotype / characteristic; example described / intermediate phenotype described / eq;	reject weaker and stronger ignore dominant and recessive	max 2

TOTAL 9 MARKS

Question number			Answer	Notes	Marks
3	(a)	(i)	1. homozygous recessive = 11 / eleven; 2. homozygous dominant = 0 / zero / none;		2
		(ii)	(½ x ½ x ½) = 0.125 / 12.5<u>%</u> / 1/8;		1
	(b)		1. (less) supply of glucose / oxygen; 2. (less) <u>aerobic</u> respiration; 3. (more) <u>anaerobic</u> respiration; 4. less energy / ATP; 5. lactic acid / low(er) pH; 6. enzymes <u>denature</u>; 7. (muscle) cells die / cannot contract;	1. ignore supply energy Allow idea that before blockage blood supplies oxygen for aerobic respiration for Mp1 and Mp2 7. Ignore fatigue	Max 5

Question number			Answer	Notes	Marks
4	(a)	(i)	same <u>alleles</u> / DD / dd / both dominant / both recessive / only one type of allele / eq;	ignore only one allele present allow other letters eg AA or aa. reject <u>genes</u>	1
		(ii)	DD; Dd;		2
	(b)	(i)	mother DD and father dd; Dd and Dd;		2
		(ii)	zero / 0(%) / no chance / 0 out of 2 / eq;	Allow any ratio 0:whatever	1
	(c)	(i)	22 800 000 / 22.8 million;	allow one mark for 12 or 0.12 in working	2
		(ii)	not enough people tested / small sample / only 24 tested / chance / probability / eq;	ignore anomalous ignore human error	1
				Total	**9**

Question number	Answer	Notes	Marks
5 (a)	both characteristics expressed / both alleles are expressed / influence the phenotype (of the heterozygote) / both shown in phenotype / eq;	reject genes ignore same dominance ignore neither dominates	1
(b)	Parents $\quad\quad\quad I^A I^O \quad\quad\quad I^B I^O$; Gametes $\quad\quad I^A \quad I^O \quad\quad I^B \quad I^O$; Offspring $\quad\quad I^A I^O \quad\quad I^B I^O \quad\quad I^A I^B \quad\quad I^O I^O$;	allow if I not shown allow all marks if shown as Punnett square transfer error ONLY for gametes mark	3
		Total	4