<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>1 (a)</td><td>1. (section of) DNA;
2. (co s) for a protein / polypeptide;</td><td>Ignore codes for characteristic</td><td>2</td></tr>
<tr><td>(b) (i)</td><td>guanine;</td><td>Allow phonetic spelling eg gwanine = 1</td><td>1</td></tr>
<tr><td>(ii)</td><td>420;</td><td></td><td>1</td></tr>
<tr><td>(c) (i)</td><td><table><tr><th>Chicken</th><th>Genotype</th></tr><tr><td>parent with all black feathers</td><td>C^BC^B / BB</td></tr><tr><td>parent with all white feathers</td><td>C^WC^W / WW</td></tr><tr><td>offspring with a mixture of black and white feathers</td><td>C^BC^W / BW;</td></tr></table></td><td></td><td>1</td></tr>
<tr><td>(ii)</td><td>0.5 / ½ / 50% / 2 in 4 / eq;</td><td></td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>Total 6 Marks</td></tr>
</table>

Question number	Answer	Notes	Marks
2(a)	TT and tt;	accept symbols other that T or t	1
	T and t;	eg P and p	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% / 1/8;		1
(b)	1. (less) supply of glucose / oxygen; 2. (less) aerobic respiration; 3. (more) anaerobic respiration; 4. less energy / ATP; 5. lactic acid / low(er) pH; 6. enzymes denature; 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 $I^A I^O$ $I^B I^O$; Gametes I^A I^O I^B I^O; Offspring I^AI^O I^BI^O I^AI^B I^OI^O;	allow if I not shown allow all marks if shown as Punnett square transfer error ONLY for gametes mark	3
		Total	4