

Inheritance - Mark Scheme

Q1.

Question Number	Answer	Additional Guidance	Mark
(a) (i)	1. somatic involves {body / somatic} cells AND germ line involves {gametes / ovaries / testes / eq} / eq ; 2. somatic can't be inherited / germ line can be inherited / eq ; 3. somatic legal / germ line illegal / eq ; 4. somatic temporary treatment / germ line could be cure / eq ;	1. Must mention both 3 ACCEPT prohibited	(2) Exp

Question Number	Answer	Additional Guidance	Mark
(a) *(ii) (QWC)	(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. reference to {a vector / named vector} e.g. liposome, virus, plasmid ; 2. idea of inserting (functional) gene that codes for the CFTR protein ; 3. reference to method of getting into lungs e.g. nebuliser ; 4. CFTR protein made via { transcription/ translation } / eq ; 5. Allows chloride ions to leave cells / eq ; 6. idea that water leaves cells by osmosis / eq ; 7. idea that mucus is less sticky ;	QWC emphasis answer must be in a logical sequence Penalise once for point out of sequence / context 2. NOT replaces faulty gene 3. ACCEPT Inhalation /aerosol 7. ACCEPT not sticky / more runny / less viscous / thinner	(4) Exp

Question Number	Answer	Additional Guidance	Mark
(b)	1. idea of loosens mucus ; 2. idea of mucus expelled from lungs (more easily) ; 3. idea of clearer airways / better breathing ;	1. IGNORE 'becomes thinner' ACCEPT sticks less 2. ACCEPT helps to remove mucus 3. ACCEPT less breathless, lower risk of chest infections, larger surface area for gas exchange in lungs. IGNORE less coughing	(2) Exp

Q2.

Question Number	Answer	Additional Guidance	Mark
	<p>1. produces {thicker / stickier / more viscous / eq} mucus ;</p> <p>2. blocking { trachea / bronchi / bronchioles / airway / eq} / eq ;</p> <p>3. cilia are unable to move mucus out of lungs / eq ;</p> <p>4. idea of reduced flow of {air / oxygen } to alveoli ;</p> <p>5. idea of reduced concentration gradient for {oxygen / carbon dioxide} (in alveoli) ;</p> <p>6. idea of loss of surface area / elasticity / eq ;</p> <p>7. idea of reduced gaseous exchange ;</p> <p>8. trapped bacteria may result in more respiratory infections / eq ;</p>	<p>1. ACCEPT sticky / thick in context, ACCEPT less water in mucus</p> <p>2. IGNORE respiratory system ACCEPT alveoli</p> <p>7. ACCEPT less O₂ diffuses into blood IGNORE larger diffusion pathway</p>	(4)

Q3.

Question Number	Answer	Additional Guidance	Mark
	<p>1. idea that both of these alleles need to be present in order for the recessive phenotype to be expressed ;</p> <p>AND any two of:</p> <p>2. different form of a gene / eq ;</p> <p>3. same locus /position / eq ;</p> <p>4. different base sequence / eq ;</p>	<p>1. ACCEPT not expressed in presence of dominant allele</p> <p>2. ACCEPT type of same gene NOT just type of gene</p>	(3)

Q4.

Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to four of the following:</p> <ul style="list-style-type: none"> deletion could affect every codon (on the mRNA) / substitution will only affect one codon (1) deletion more likely to affect the position of { stop codon / start codon } (1) deletion results in a different sequence of amino acids / substitution may not affect the sequence of amino acids (1) substitution may code for the same amino acid (1) (same amino acid) due to the degenerate nature of the genetic code (1) 	<p>Allow reference to 'frame shift'</p>	(4)

Q5.

Question Number	Answer	Additional Guidance	Mark
	<p>A description that makes reference to two of the following:</p> <ul style="list-style-type: none"> (adding or removing one or two nucleotides) changes the triplet code introducing a new {start / stop} codon coding for a shorter sequence of amino acids (1) 	<p>ALLOW different codons produced (1)</p> <p>ALLOW one amino acid shorter</p>	(2)