

Inherited Disorders MS

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	1 in 4 / $\frac{1}{4}$ / 1: 3 / 25% / 0.25	do not accept 3:1 / 1:4 / 2:6	1
b)	<p>either from C and D any three from:</p> <ul style="list-style-type: none"> •C and D have disorder •I/J don't have disorder •C and D have dominant and recessive alleles •recessive alleles from C and D passed to I/J or I/J have two recessive alleles or from A and B •A is homozygous recessive / rr, and B is heterozygous / Rr can be shown in words or symbols •offspring can be rr or Rr described 	<p>accept synonyms for dominant / recessive eg. Normal / faulty accept genetic diagram if clearly referring to correct</p> <p>individuals or genotypes on family tree allow 'gene' for 'allele' ignore 'C & D are carriers' NB if allele was recessive then all offspring of C and D would have the disorder = 3 marks</p> <p>assume response refers to A+B unless contradicted</p> <p>allow any symbol allow without key</p>	3
c)i)	(embryos) checked for inherited / genetic disorders / conditions	accept diseases for disorders	1
c)ii)	<p>any three from:</p> <ul style="list-style-type: none"> ✘ C/D have disorder / have dominant allele ✘ chance of embryo / foetus / child having disorder or may pass on alleles for disorder to their offspring ✘ C/D might want to decide on termination or prepare for child with disorder ✘ G and H don't have disorder / both homozygous recessive / have no dominant alleles (for this disorder) ✘ so offspring (of G and H) 	accept disease / condition accept 'gene' for 'allele' ignore reference to 'carriers'	3

	cannot / don't have disorder		
Total marks			8

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	both parents Aa aa in offspring correctly derived from parents / aa correctly derived from the parents given offspring aa identified as having cystic fibrosis	accept other upper and lower case letters without key or symbols with a key allow shown as gametes in punnet square ignore other offspring / gametes for this mark parents do not have to be correct may be the only offspring shown or circled / highlighted / described	1 1 1
b)i)	any one from: •sure / greater chance of healthy /non-cystic fibrosis egg / embryo /child •greater chance of fertilisation	accept converse if clear eg if you (only) took one it might have cystic fibrosis / might not be fertilised accept some may have the allele reference to suitable embryo is insufficient	1
b)ii)	advantages any two from •greater / certain chance of having child / embryo without cystic fibrosis / healthy •child with cystic fibrosis difficult / expensive to bring up •cystic fibrosis (gene / allele) not passed on through generations disadvantages any two from: •operation dangers eg infection •ethical or religious issues linked to killing embryos •(high) cost •possible damage to embryo (during testing for cystic fibrosis / during operation) plus conclusion a statement that implies a valued, 1 qualified judgement eg it is wrong because embryos are killed	to gain 3 marks both advantages and disadvantages must be given ignore references to abortion unless qualified by later screening Note: the conclusion mark cannot be given unless a reasonable attempt to give both an advantage and a disadvantage has (already) been made	3 1

		do not award the mark if the conclusion only states that advantages outweigh disadvantages	
Total marks			8

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	any one from: ✗ A ✗ C		1
a)ii)	any one from: ✗ B ✗ D		1
b)i)	pig A		1
b)ii)	a gamete		1
c)	XY or YX X Y XY or YX	in this order only	1 1 1
Total marks			7

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	cystic fibrosis (allele / gene) recessive carrier has only one cystic fibrosis allele / gene	allow an annotated genetic diagram accept carrier is heterozygous accept any symbol with key or accept conventional use of symbols penalise use of chromosome once only	1 1
b)	any one from: ✗ Huntington's (allele / gene) dominant ✗ (to have Huntington's) need only one Huntington's allele / gene		1
Total marks			3

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	allele expressed even when other allele present or expressed if just one copy of allele is present or expressed if heterozygous	if present other allele not expressed	1
a)ii)	2 affected parents have unaffected child or 1 and 2 5 / 6 or if recessive all of 1 and 2's children would have CADASIL		1
a)iii)	heterozygous – has unaffected children or because if homozygous all children would have CADASIL		1
b)i)	genetic diagram including: correct gametes: D and d and d (and d) derivation of offspring genotypes: Dd Dd dd dd identification of Dd as CADASIL or dd as unaffected correct probability: 0.5 / ½ / 1 in 2 /50%/1:1	accept alternative symbols, if defined ignore 7 / 8 or male / female allow just Dd dd if ½-diagram allow ecf if correct for student's gametes allow ecf if correct for student's gametes	1 1 1 1
c)i)	stem cells can differentiate or are undifferentiated / unspecialised can form blood vessel cells / brain cells or stem cells can divide		1 1
c)ii)	ethical argument – eg no risk of damage to embryo or adult can give consent for removal of cells or adult can re-grow skin or if from a relative then less chance of rejection or if from self then no chance of rejection or skin cells more accessible	more ethical qualified ignore religion unqualified	1
Total marks			10

QUESTION 6

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	cell membranes		1
b)i)	two recessive / cystic fibrosis / faulty / diseased / the allele(s) / genes from Bob and Carol / both parents /the parents	two can be implied by second marking point ignore chromosomes if no other marks awarded 'Carol is a carrier' gains 1 mark	1 1
b)ii)	(inherited) dominant / normal allele /gene from Carol / mother	ignore references to recessive allele / gene from father / Bob if no other marks awarded he has just/ only one recessive allele gains 1 mark	1 1
c)i)	reduce number of people with cystic fibrosis (in population) or reduce health-care costs or expensive to have baby with cystic fibrosis	accept to allow decision / emotional argument qualified eg allows abortion or allows people to make choices about termination or help to prepare financially / emotionally etc	1
c)ii)	any one from: ✘ possible damage / risk to embryo / fetus / baby ✘ screening / it is expensive ✘ (may) have to make ethical / moral / religious decisions ✘ right to life	allow possible harm / risk to mother ignore not natural / playing God / unethical / immoral / religious unqualified	1
Total marks			7