

Genetic disorders

Mark scheme

1. (a) cell membranes 1
- (b) (i) two recessive / cystic fibrosis / faulty / diseased / the allele(s) / genes 1  
*two can be implied by second marking point*  
*ignore chromosomes*  
 from Bob **and** Carol / both parents / the parents 1  
*if no other marks awarded 'Carol is a carrier' gains 1 mark*
- (ii) (inherited) dominant / normal allele / gene 1  
 from Carol / mother 1  
*ignore references to recessive allele / gene from father / Bob*  
*if no other marks awarded he has just / only one recessive allele gains 1 mark*
- (c) (i) reduce number of people with cystic fibrosis (in population)  
**or**  
 reduce health-care costs  
**or**  
 expensive to have baby with cystic fibrosis 1  
*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
- (ii) any **one** from:  
 • possible damage / risk to embryo / fetus / baby  
*allow possible harm / risk to mother*  
 • screening / it is expensive  
 • (may) have to make ethical / moral / religious decisions  
*ignore not natural / playing God / unethical / immoral / religious unqualified*  
 • right to life 1
- [7]
2. (a) 1 in 4 / 1/4 / 1: 3 / 25% / 0.25 1  
*do **not** accept 3:1 / 1:4 / 2:6*
- (b) **either** from C **and** D  
*accept synonyms for dominant / recessive eg*  
*Normal / faulty*  
*accept genetic diagram if clearly referring to correct individuals or*  
*genotypes on family tree*  
*allow 'gene' for 'allele'*
- any **three** from: 3
- C **and** D have disorder  
*ignore 'C & D are carriers'*
  - 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  
*NB if allele was recessive then all offspring of C **and** D would have the disorder = 3 marks*
  - or from A **and** B  
*assume response refers to A+B unless contradicted*
  - A is homozygous recessive / rr, **and** B is heterozygous / Rr can be shown in words or symbols  
*allow any symbol*
  - offspring can be rr **or** Rr described  
*allow without key*
- (c) (i) (embryos) checked for inherited / genetic disorders / conditions 1  
*accept diseases for disorders*
- (ii) any **three** from: 3
- C/D have disorder / have dominant allele  
*accept disease / condition*  
*accept 'gene' for 'allele'*  
*ignore reference to 'carriers'*
  - 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) cannot / don.t have disorder

[8]