

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	Blood vessel at bottom of diagram with blood flowing away from the capillaries clearly labelled {P / pulmonary vein};		(1)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	Any one difference described e.g. 1. capillary wall is one cell thick while vein wall is thicker / eq 2. capillary has no {collagen/ muscle} 3. capillaries do not have valves 4. smaller lumen in capillaries than veins ;	1. ACCEPT capillary wall is only one cell thick NOT cell wall 2 ACCEPT converse 3 ACCEPT converse	(1)

Question Number	Answer	Additional Guidance	Mark
1(b)	1. O ₂ diffuses more quickly than CO ₂ ; 2. different concentration gradients / eq ; 3. molecules are different sizes / eq ;	2. ACCEPT higher concentration gradient for O ₂ . ACCEPT gradients are 7 for oxygen and 2 for carbon dioxide	(2)

Question Number	Answer	Additional Guidance	Mark
1(c)	(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. idea that large surface area provided by alveoli ; 2. idea that large surface area provided by capillary network ; 3. idea that concentration gradient maintained by {ventilation of / air flow in / eq } the lungs ; 4. idea that concentration gradient maintained by {circulation / mass flow / eq } of blood ; 5. idea that diffusion pathway is small because alveoli have a thin wall ; 6. idea that diffusion pathway is small because capillaries { have a thin wall / are in contact with alveoli / are only one cell thick / eq } ; 7. idea that air is warmed because lungs are in core of body ; 8. warmer air enables faster {movement / diffusion / eq } of gases / eq ; 9. reference to { respiratory pigment / haemoglobin / red blood cells / eq } to carry oxygen ;	QWC emphasis is on clarity of expression 1&2. IGNORE large surface area to volume ratio unless in context of whole body 5.& 6. NOT cell wall	(5)

Question Number	Answer	Additional Guidance	Mark
2 (a)	<ol style="list-style-type: none"> idea that the {alveoli / air sacs / lung / tissue } have been {replaced / destroyed / eq} (by the tubercle) ; idea that the (tubercle / destroyed lung tissue) has reduced the (surface) area (of the lung) ; breathing problems due to { gas exchange being reduced / less oxygen in blood / eq } ; idea that the coughing is { due to irritation /to remove the dead tissue / eq} ; blood coughed up is due to damage of (lung) blood vessels / eq ; 	<p>1 IGNORE blocks</p> <p>4 ACCEPT tubercle</p> <p>5 IGNORE idea that lung damage causes bleeding</p>	(4)

Question Number	Answer	Additional Guidance	Mark
2 (b) (i)	<ol style="list-style-type: none"> idea that bacteria are resistant to fewer {antibiotics / antibiotic combinations} (in 2006 than 2007) ; in both years there are resistant strains to {streptomycin / INH + rifampicin + ethambutol / INH } ; idea that there are resistant strains to INH + rifampicin in 2006 but not in 2007 ; idea that there are resistant strains to {ethambutol / rifampicin} in 2007 but not in 2006 ; 	<p>ACCEPT clear abbreviations to the names of the antibiotics throughout</p> <p>1 ACCEPT a description e.g. new resistances, resistant to 4 in 2006 and 5 in 2007</p> <p>3 ACCEPT idea that {resistance decreased to zero / no longer resistant}</p> <p>4 ACCEPT idea of resistance developing</p> <p>NB development of new resistances to {ethambutol / rifampicin} = Mp 1 and 4</p>	(3)

Question Number	Answer	Additional Guidance	Mark
2(b)(ii)	<ol style="list-style-type: none"> 1. bacteria have a mutation in {DNA / gene / eq } ; 2. idea that the {presence / usage of} {antibiotic (INH) / INH} acts as a selection pressure ; 3. idea that the allele (for resistance) is passed on ; 4. idea that bacteria {divide by asexual reproduction / divide by binary fission / produce clones / eq} ; 5. idea of increasing the allele frequency ; 6. idea that the more resistant bacteria there are, the more likely new strains will acquire the (resistance) gene ; 	<p>3 NOT gene</p> <p>4 ACCEPT divide by mitosis / conjugation / transduction / transformation / eq</p>	(3)

Question Number	Answer	Additional Guidance	Mark
2(b)(iii)	<ol style="list-style-type: none"> 1. reference to codes of {practice / conduct / eq } ; 2. idea that appropriate {antibiotics / named example} should be given to patients ; 3. idea of {educating patients about taking antibiotics / taking the full course of antibiotics ; 4. credit another appropriate procedure e.g. hand washing, screening ; 	<p>1 ACCEPT named policy /code NB Mp5 is for named practice</p> <p>2 ACCEPT not giving antibiotics if not necessary / not using antibiotics for prophylactic treatment / using narrow spectrum antibiotics / rotate antibiotic use</p>	(2)

Question Number	Answer	Additional Guidance	Mark
3(a) QWC	(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. <i>alveoli</i> one cell thick / thin (<i>epithelium</i>) ; 2. {walls / <i>endothelium</i> } of <i>capillaries</i> { one cell thick / thin} ; 3. <i>Alveoli</i> covered with <i>capillaries</i> / eq ; 4. idea of short (<i>diffusion</i>) distance ; 5. reference to <i>diffusion</i> ; 6. idea of large surface area provided by { <i>alveoli</i> / <i>capillaries</i> } ; 7. idea that <i>concentration gradient</i> maintained by { <i>ventilation</i> / breathing / eq } ; 8 ref. to large numbers of red blood cells OR idea that <i>oxygen</i> combines with <i>haemoglobin</i> ; 9. idea that <i>concentration gradient</i> maintained by blood flow ; 10. {reference to / description of} <i>Fick's Law</i> ;	QWC emphasis is spelling Penalise once only 2. IGNORE <i>capillaries</i> are one cell thick NOT one cell thick membrane, cell wall 4. ward Mps 4 and 5 if diffusion stated 6. IGNORE 'many alveoli' 10. Diffusion rate is proportional to the surface area	(5) p

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3(b) (i)	1. Idea that blood carries {oxygen / carbon dioxide} ; 2. Idea that blood moving maintains concentration gradient ; 3. Reference to mass flow ; 4. Idea that organs have large surface area to volume ratio ;	1. CEPT oxygenated blood 3. IGNOR mass transport 4. IGNORE <i>Daphnia</i> has a large surface area	(2) Exp

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3 (b) (ii)	1. idea that one side (of heart) transports blood to the lungs other to the body ; 2. separation of oxygenated and deoxygenated blood / eq ; 3. idea of maintaining concentration gradient ; 4. comment on blood pressures e.g. lower to lungs, higher to body ; 5. Reference to mass flow / supply of O ₂ to body cells maximised ; 6. idea of need for a good supply of oxygen as (mammals are) {very active / high rate of metabolism / warm blooded / eq} ;	5. IGNOR mass transport	(3) p

Question Number	Answer	Additional Guidance	Mark
4(a)	1. homozygous ; 2. channel / transport / transmembrane / intrinsic / globular ; 3. chloride / Cl^- / Cl ; 4. reproductive / eq ;	1. ACCEPT (a) homozygote 3. DO NOT ACCEPT chlorine	(4)

Question Number	Answer	Additional Guidance	Mark
4(b)	1. produces { thicker / stickier / more viscous / eq } mucus ; 2. blocking { trachea / bronchi / bronchioles / airway / eq } / eq ; 3. cilia are unable to move mucus out of lungs / eq ; 4. idea of reduced flow of { air / oxygen } to alveoli ; 5. idea of reduced concentration gradient for { oxygen / carbon dioxide } (in alveoli) ; 6. idea of loss of surface area / elasticity / eq ; 7. idea of reduced gaseous exchange ; 8. trapped bacteria may result in more respiratory infections / eq ;	1. ACCEPT sticky / thick in context, ACCEPT less water in mucus 2. IGNORE respiratory system ACCEPT alveoli 7. ACCEPT less O_2 diffuses into blood IGNORE larger diffusion pathway	(4)

Question Number	Answer	Additional Guidance	Mark
4(c) (i)	1. chorionic villus sampling / amniocentesis ; 2. idea that (fetal) { cells / DNA } are obtained from appropriate source { placenta / amniotic fluid / eq } ; 3. (cells / DNA) tested for presence of { CFTR / recessive / faulty / mutant / eq } { allele / gene } / eq ;	1. ACCEPT CVS DO NOT ACCEPT chronic 2. ACCEPT from embryo 3. ACCEPT test for cystic fibrosis allele or gene	(3)

Question Number	Answer	Additional Guidance	Mark
4 (c) (ii)	Any of the following paired points 1. idea that it may result in a miscarriage / choice of an abortion ; 2. { killing / eq } is { wrong / unethical / eq } ; OR 3. idea of risk of false { positive / negative } ; 4. comment on consequence e.g. healthy fetus may be aborted / parents not prepared for child with cystic fibrosis / eq ; OR 5. if cystic fibrosis or some other abnormality may be found ; 6. comment on possible problems with { future employment / insurance / what constitutes a serious condition } / eq ; OR 7. who has right to decide if tests should be performed / eq ; 8. { implications of medical costs / disagreements over next step } ; OR 9. issues relating to confidentiality of { parents / child } / eq ; 10. idea that { some other abnormality may be found / paternal DNA does not match / other family members have right to know results } ;	1. ACCEPT can { harm / damage / kill } the fetus 2. ACCEPT fetus has right to life / distress to parents / genetic discrimination / eugenics 3. ACCEPT it isn't 100% accurate 4. ACCEPT parents did not have choice of abortion	(2)