

1)

Question Number	Answer	Mark
1(a)(i)	A ;	(1)

Question Number	Answer	Mark
1(a)(ii)	A ;	(1)

Question Number	Answer	Mark
1(a)(iii)	D ;	(1)

Question Number	Answer	Mark
1(a)(iv)	B ;	(1)

Question Number	Answer	Mark
1(a)(v)	D ;	(1)

2)

(a) QWC	<p>(QWC - Spelling of technical terms (<i>shown in italics</i>) must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> <li>1. idea of (<i>mutation</i> / named mutation) causing different base sequence ;</li> <li>2. reference to different {sequence of <i>amino acids</i> / <i>primary structure</i>} / eq ;</li> <li>3. reference to {<i>B chain</i> / <i>haemoglobin</i> / <i>protein</i> / <i>polypeptide</i>} being the wrong shape ;</li> <li>4. <i>haemoglobin</i> no longer binds oxygen / binds less oxygen / eq ;</li> <li>5. {less / no } oxygen {supplied / carried / eq} (to the cells) / eq ;</li> <li>6. correct reference to <i>respiration</i> / eq ;</li> <li>7. idea of breathlessness due to body trying to take in more oxygen ;</li> <li>8. idea of tiredness due to lack of energy ;</li> </ol>	max (4)						
(b)	<table border="1" style="width: 100%; text-align: center;"> <tbody> <tr> <td>25(%)</td> <td>25(%)</td> <td>50(%)</td> </tr> <tr> <td>no chance / 0 (%)</td> <td>no chance / 0 (%)</td> <td>100 (%)</td> </tr> </tbody> </table> <p>All 3 in a row = 2 marks 1 or 2 in a row correct = 1 mark</p>	25(%)	25(%)	50(%)	no chance / 0 (%)	no chance / 0 (%)	100 (%)	(4)
25(%)	25(%)	50(%)						
no chance / 0 (%)	no chance / 0 (%)	100 (%)						

CHERRY HILL TUITION EDEXCEL (B) BIOLOGY AS PAPER 7 MARK SCHEME

(c) QWC	<ol style="list-style-type: none"> <li>1. reference to use of {normal / correct} {allele / gene};</li> <li>2. for {haemoglobin / B chain};</li> <li>3. reference to introduction of {gene / allele / DNA} into cells ;</li> <li>4. cells named as (bone) marrow / eq ;</li> <li>5. reference to use of vector (to introduce gene into cells) ;</li> <li>6. (named vector) e.g. virus, liposome ;</li> <li>7. credit reference to appropriate mode of delivery of vector e.g. injection into (bone) marrow ;</li> <li>8. reference to need for repeated treatment ;</li> </ol>	max (4)
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3)

a)(i)	<ol style="list-style-type: none"> <li>1. both hexose molecules in disaccharide correctly drawn ;</li> <li>2. indication that water is formed ;</li> <li>3. glycosidic bond correctly drawn ;</li> </ol>	(3)
a)(ii)	condensation / polymerisation ;	(1)
a)(iii)	(1, 4) glycosidic (bond / link) ;	(1)
b)(i)	A ;	(1)
b)(ii)	B ;	(1)
b)(iii)	B ;	(1)
c)(i)	<ol style="list-style-type: none"> <li>1. genotypes of parents correctly shown ;</li> <li>2. alleles present in gametes correctly shown ;</li> <li>3. possible genotypes of offspring correctly shown ;</li> <li>4. probability stated as {0.5 / 50% / 1 in 2 / ½ / 50:50} ;</li> </ol>	(4)
c)(ii)	The same (as the probability is for the first child) ;	(1)

4)

(a) QWC	<p>(QWC - Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> <li>1. reference to CFTR {gene / channel} not functioning properly ;</li> <li>2. reference to {thicker / stickier / eq } <i>mucus</i> ;</li> <li>3. (<i>mucus</i>) blocks (<i>pancreatic</i>) {duct(s) / eq } ;</li> <li>4. in the <i>pancreas</i> ;</li> <li>5. idea that <i>enzymes</i> cannot {be secreted into / reach} <i>small intestine</i> ;</li> <li>6. idea of reduced <i>digestion</i> of {food / named food} ;</li> <li>7. reference to reduced <i>absorption</i> / eq ;</li> <li>8. idea of {<i>malnutrition</i> / <i>weight loss</i>} ;</li> <li>9. idea of {<i>self-digestion</i> of (<i>pancreatic</i>) cells / problems controlling blood sugar levels / <i>cysts</i> / <i>fibroids</i>} ;</li> </ol>	(4)
b)	<ol style="list-style-type: none"> <li>1. reference to {IVF / description of preimplantation} ;</li> <li>2. {embryo / eq} DNA analysed / eq ;</li> <li>3. presence of CFTR {gene mutation / faulty allele / eq} tested for / eq ;</li> </ol>	(3)

(c)	<p>Any of the following paired points</p> <ol style="list-style-type: none"> <li>1. who has right to decide if tests should be performed / eq ;</li> <li>2. {implications of medical costs / disagreements over next step / embryo has rights} ;</li> </ol> <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> <li>3. issues relating to confidentiality of {parents / child} / eq ;</li> <li>4. idea that {some other abnormality may be found / paternal DNA does not match / other family members have right to know results} ;</li> </ol> <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> <li>5. idea some other abnormality may be found / false negative ;</li> <li>6. comment on possible problems with e.g. future employment / insurance / what constitutes a serious condition / eq ;</li> </ol> <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> <li>7. idea that embryo could be {damaged / destroyed / discarded / eq} / false positive ;</li> <li>8. embryo {is a potential life / has rights} / destroying embryo is {wrong / unethical / murder / eq} ;</li> </ol>	(2)
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5)

(a)	(DNA) { polymerase / helicase / ligase} ;	(1)
b)	<p>Stage 1</p> <ol style="list-style-type: none"> <li>1. only one bond drawn in lower half of tube ;</li> </ol> <p>Stage 2</p> <ol style="list-style-type: none"> <li>2. one only bond drawn (higher than the one drawn in stage 1) ;</li> </ol> <p>Stage 3</p> <p>Diagram</p> <ol style="list-style-type: none"> <li>3. {1 / 2} molecules shown with one light and one heavy strand ;</li> <li>4. {1 / 2} molecules shown with two light strands;</li> </ol> <p>Test tube</p> <ol style="list-style-type: none"> <li>5. 2 bands shown in roughly correct position (middle to upper half of test tube) ;</li> <li>6. bands should be of (roughly) equal width ;</li> </ol> <p>[consequential error from stage 2 should apply for both marking points 5 and 6]</p>	(6)

6)		
(a)	<ol style="list-style-type: none"> <li>1. presence of amine group / eq ;</li> <li>2. presence of carboxyl group / eq ;</li> <li>3. reference to R group ;</li> <li>4. reference to central carbon atom ;</li> </ol> <p>[award marks on correctly drawn diagram]</p>	(2)
(b)	<ol style="list-style-type: none"> <li>1. correct reference to transcription ;</li> <li>2. DNA {unwinds / strands separate / eq} ;</li> <li>3. (RNA) (mono)nucleotides {line up against / attach / eq} to one (DNA) {strand / template / eq} ;</li> <li>4. reference to <u>complementary</u> base pairing (between DNA and (mono)nucleotides) ;</li> <li>5. reference to {(mono)nucleotides joining together / formation of phosphodiester bonds} ;</li> <li>6. correct reference to condensation reaction ;</li> <li>7. correct reference to named enzymes involved / eq ;</li> <li>8. mRNA detaches (from DNA) / eq ;</li> </ol>	(4)
(c)(i)	DISCOUNTED QUESTION / DO NOT MARK	(0)
(c)(ii)	B ;	(1)
(c)(iii)	D ;	(1)

7)		
(a) (i)	<ol style="list-style-type: none"> <li>1. group on diet Q loses more mass (overall in the 6 months) / eq ;</li> <li>2. both groups lost mass in the first { 2 / 6 } months ;</li> <li>3. the group on diet Q {lost the most mass / lost mass the fastest} in the first 2 months ;</li> <li>4. between 2 and 6 months there was {no more loss of mass / slight increase in mass} in the group on diet P AND those on diet Q lost more mass / eq ;</li> <li>5. credit correct manipulation of figures to compare mass loss between two of the groups ;</li> </ol>	(3)
(a) (ii)	not following the diet {anymore / so strictly} / not doing so much exercise / eq ;	(1)
(a)(iii)	<p>Any two from:</p> <ol style="list-style-type: none"> <li>1. gender / eq ;</li> <li>2. age / eq ;</li> <li>3. extent to which individuals were over-weight / eq ;</li> <li>4. occupation / eq ;</li> <li>5. alcohol intake / eq ;</li> <li>6. standardised exercise programme / amount of exercise taken eq ;</li> <li>7. health / disability / stress / eq ;</li> <li>8. timing of meals / eq ;</li> <li>9. time of weighing / eq ;</li> </ol>	(2)
(b)	<ol style="list-style-type: none"> <li>1. idea that exercise uses energy ;</li> <li>2. the {longer / more intense} the exercise, the more {energy used / weight loss} / eq ;</li> <li>3. idea of {mass / weight} loss depends on energy input lower than energy output ;</li> <li>4. idea that exercise increases metabolism / muscles use more energy than fat ;</li> </ol>	(3)

8)

<b>(a)</b>	<ol style="list-style-type: none"> <li>1. amino acids ;</li> <li>2. peptide ;</li> <li>3. condensation / polymerisation ;</li> <li>4. amino / amine / <math>\text{NH}_3^+</math> / <math>\text{NH}_2</math> ;</li> <li>5. carboxyl / carboxylic (acid) / <math>\text{COO}^-</math> / <math>\text{COOH}</math> ;</li> </ol> <p>[Accept answers for 4 and 5 the opposite way round]</p>	<b>(5)</b>
<b>(b)(i)</b>	<p>ALLOW Mps in context of clearly labelled diagram</p> <ol style="list-style-type: none"> <li>1. globular / eq ;</li> <li>2. reference to active site ;</li> <li>3. reference to specific shape of active site ;</li> <li>4. reference to {bonds / named bond / interaction / eq} between R groups ;</li> <li>5. credit correctly named {bond/interaction} e.g. disulphide bond, hydrogen bonds, hydrophobic interactions (between R groups) ;</li> </ol>	<b>(3)</b>
<b>(b)(ii)</b>	<ol style="list-style-type: none"> <li>1. (primary structure) {position / sequence / order / eq} of the {amino acids / R groups} / eq ;</li> <li>2. idea that this determines the {positioning / type} of the {bonds / folding / eq} ;</li> <li>3. determining the {shape / properties} of the active site / eq ;</li> <li>4. idea of interaction of active sites and substrates e.g. enzyme substrate complex forms ;</li> <li>5. idea of {polar / hydrophilic} on the outside of enzymes / {non polar / hydrophobic} on the inside / eq ;</li> <li>6. reference to solubility ;</li> </ol>	<b>(3)</b>