

CHERRY HILL TUITION EDEXCEL (B) BIOLOGY AS PAPER 15 MARK SCHEME

| 1)<br>number |   |     |
|--------------|---|-----|
| (a)          | <ol style="list-style-type: none"> <li>1. protein / glycoprotein ;</li> <li>2. facilitated diffusion ;</li> <li>3. active transport / eq ;</li> <li>4. ATP / adenosine triphosphate ;</li> </ol>  | (4) |
| b)(i)        | <ol style="list-style-type: none"> <li>1. 77-70 / 7;</li> <li>2. correct division by 77 (multiplied by 100) to give correct answer, e.g. 9.1 / 9.09 / 9.0 / 9</li> </ol> <p>[CE applies]</p> <p>Correct answer = 2 marks</p>  | (2) |
| b)(ii)       | <ol style="list-style-type: none"> <li>1. idea that not all of the {juice / sugar} washed off / idea that the strawberries were not dried after rinsing properly / idea that some water reabsorbed (during washing) ;</li> <li>2. loss of mass of strawberries not as high as it should have been / eq ;</li> <li>3. (%) value too small / eq ;</li> </ol> <p>OR</p> <ol style="list-style-type: none"> <li>1. idea that strawberry {tissue / juice} lost because {washing too vigorous / tissue stuck to towel when drying / squeezing strawberries / juice absorbed from strawberries} / water lost through evaporation / eq ;</li> <li>2. loss of mass of strawberries higher than it should have been / eq ;</li> <li>3. (%) value too high / eq ;</li> </ol> | (3) |
| b)(iii)      | <ol style="list-style-type: none"> <li>1. correct reference to <u>water</u> gradient (between sugar and strawberries) ;</li> <li>2. reference to osmosis (of water from inside of strawberry to outside) ;</li> <li>3. idea that water is found in {cytoplasm / vacuoles} (of strawberry) ;</li> <li>4. reference to water as a solvent (for the sugar) ;</li> <li>5. reference to (di)polar nature of water / eq ;</li> </ol>  | (3) |

2)

|         |  |     |
|---------|--|-----|
| (a)(i)  | <p>Any three from:</p> <ol style="list-style-type: none"> <li>1. decrease in smoking / not smoking / eq ;</li> <li>2. reference to {increase / regular / eq} exercise ;</li> <li>3. improvements to diet qualified, e.g. reduce salt, reduce saturated fat, increase fibre ;</li> <li>4. maintaining appropriate weight / eq ;</li> <li>5. {moderate / reduced} alcohol consumption / eq ;</li> <li>6. reducing stress / eq ;</li> <li>7. use of medication e.g. statins, antihypertensives, warfarin ;</li> </ol> | (3) |
| (a)(ii) | <ol style="list-style-type: none"> <li>1. (less) cholesterol (in blood) to build up on artery (wall) / eq ;</li> <li>2. less likely to develop atherosclerosis / eq ;</li> <li>3. credit correct reference to subsequent consequence of atherosclerosis e.g. narrowing of arteries, ischaemia, decrease in flow of blood (to heart) ;</li> </ol>   | (2) |

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|---------|--|-----|
| (b)     | <ol style="list-style-type: none"> <li>1. age effect qualified e.g. older increases risk, {arteries {become less elastic / more easily damaged / blood pressure increases} with (increase in) age ;</li> <li>2. gender effect qualified e.g. {women less likely to develop CVD than men / oestrogen offers some protection to women against CVD } (pre menopause) / eq ;</li> </ol>  | (2) |
| (c)(i)  | <ol style="list-style-type: none"> <li>1. Finland has the highest death rate / eq ;</li> <li>2. Sweden has the lowest death rate /eq ;</li> <li>3. credit correct manipulation of figures to compare one of these countries to one other country ;</li> </ol>  | (3) |
| (c)(ii) | <ol style="list-style-type: none"> <li>1. Finland {highest on graph / not highest on map} Germany and UK have the highest on the map / eq ;</li> <li>2. idea that a number ( 3 or more) of countries are the same on the map ;</li> <li>3. France does not have the lowest number of deaths / eq ;</li> <li>4. Credit any other correct comparison ;</li> <li>5. {map shows number of deaths and graph shows relative death rate / map gives the results grouped together but graph shows individual values / map does not allow for population size} ;</li> </ol> | (2) |
| c)(iii) | <p>Any one from:</p> <ol style="list-style-type: none"> <li>1. the data on the map is shown in groups / eq;</li> <li>2. the data might come from a different year / different time / no information given on the year / eq ;</li> <li>3. different groups of people were surveyed / eq ;</li> <li>4. idea that bar graph shows number of deaths relative to population / the map does not take into account the population of the country ;</li> </ol>   | (1) |

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3)

|         |   |     |
|---------|---|-----|
| (a)     | <ol style="list-style-type: none"> <li>1. cooking decreases all the vitamins / eq ;</li> <li>2. reference to only zinc does not change / eq ;</li> <li>3. biggest decrease is in Vitamin A ;</li> <li>4. credit manipulation of figures with units (if appropriate) to compare raw and cooked ;</li> </ol>  | (3) |
| (b) 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. idea that some carrots need to be boiled in water and some cooked in microwave ;</li> <li>2. reference to control of appropriate variable;</li> <li>3. reference to {juice / cooking water} being used ;</li> <li>4. reference to DCPIP ;</li> <li>5. {reference to titration / description of titration} (of juice) ;</li> <li>6. colour change of DCPIP e.g. from blue to {colourless / pink} as juice added / until stays blue as DCPIP added ;</li> <li>7. reference to {comparison of volumes of DCPIP added to each / use of calibration curve / calculation of vitamin C concentration against known vitamin C solution} ;</li> <li>8. reference to repeats ;</li> </ol> | (5) |

4)

|     |  |  |     |
|-----|--|--|-----|
| (a) | <ol style="list-style-type: none"> <li>1. idea of more than one gene for a single characteristic ;</li> <li>2. at different loci / eq ;</li> <li>3. idea of giving rise to continuous variation ;</li> </ol>   | <ol style="list-style-type: none"> <li>1. IGNORE alleles<br/>ACCEPT 'a phenotype' if specific</li> </ol> | (2) |
| (b) | <ol style="list-style-type: none"> <li>1. malnutrition / lack of { nutrients / a named nutrient e.g. protein, calcium / eq } ;</li> <li>2. idea of nutrient required for specified growth e.g. muscle, bone ;</li> <li>3. idea of other relevant environmental factor that affects expression of genotype for height e.g. health ;</li> <li>4. idea of an environmental factor determining achievement of (genetic) potential ;</li> </ol> | <ol style="list-style-type: none"> <li>1. ACCEPT deficiency</li> <li>3. ACCEPT disease</li> </ol>        | (3) |

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| <p><b>c)(i)</b></p>                  | <ol style="list-style-type: none"> <li>1. increased for { all / both Northern and Southern } Europeans / eq ;</li> <li>2. greater increase for Southern Europeans than Northern Europeans / faster rate of increase for Southern Europeans ;</li> <li>3. idea of greatest increase for Southern Europeans from 1970 to 1975 ;</li> <li>4. idea of fall in height for Northern Europeans between 1970 and 1975 ;</li> <li>5. manipulation of data to either show the increase of both or to show that the increase was greater for Southern Europeans than Northern Europeans ;</li> </ol> | <ol style="list-style-type: none"> <li>1. ACCEPT separate comments for North and South</li> <li>2. ACCEPT converse</li> </ol> <p>Mp2 can also gain Mp1 if height referred to</p> <p>5. ACCEPT as mm</p> <table border="1"> <thead> <tr> <th></th> <th>Increase</th> <th>increase as %</th> </tr> </thead> <tbody> <tr> <td>Southern</td> <td>4.3 - 4.4 cm</td> <td>2.5-2.6%</td> </tr> <tr> <td>Northern</td> <td>2.3cm</td> <td>1.29 or 1.3%</td> </tr> <tr> <td>Difference between N and S Europeans</td> <td>2 / 2.1 cm more for SE</td> <td></td> </tr> </tbody> </table> |  | Increase | increase as % | Southern | 4.3 - 4.4 cm | 2.5-2.6% | Northern | 2.3cm | 1.29 or 1.3% | Difference between N and S Europeans | 2 / 2.1 cm more for SE |  | <p style="text-align: right;"><b>(3)</b></p> |
|--------------------------------------|---|--|--|----------|---------------|----------|--------------|----------|----------|-------|--------------|--------------------------------------|------------------------|--|--|
|                                      | Increase  | increase as %  |  |          |               |          |              |          |          |       |              |                                      |                        |  |  |
| Southern                             | 4.3 - 4.4 cm  | 2.5-2.6%   |  |          |               |          |              |          |          |       |              |                                      |                        |  |  |
| Northern                             | 2.3cm   | 1.29 or 1.3%   |  |          |               |          |              |          |          |       |              |                                      |                        |  |  |
| Difference between N and S Europeans | 2 / 2.1 cm more for SE  |  |  |          |               |          |              |          |          |       |              |                                      |                        |  |  |
| <p><b>(c)(ii)</b></p>                | <ol style="list-style-type: none"> <li>1. idea of change in diet or differences in diets between Northern and Southern Europeans ;</li> <li>2. difference in diet described, eg more protein ;</li> <li>3. idea of improved health care or better sanitation ;</li> <li>4. less effects of disease on growth / eq ;</li> <li>5. differences due to migration / eq ;</li> <li>6. idea of changes to gene pool as a result of migration ;</li> </ol>  | <ol style="list-style-type: none"> <li>4. ACCEPT idea of vaccinations</li> </ol>   | <p style="text-align: right;"><b>(2)</b></p> |          |               |          |              |          |          |       |              |                                      |                        |  |  |

5)

|                                   |  |   |   |   |     |
|-----------------------------------|--|---|---|---|-----|
| (a)                               |  |   |   |   | (3) |
|                                   |  | X | ✓ | ✓ |     |
|                                   |  | ✓ | X | ✓ |     |
| :::<br>Any 2 correct for one mark |  |   |   |   |     |

|       |   |     |
|-------|---|-----|
| b)(i) | 1. {base / eq} (of aorta) ;<br>2. prevents backflow (of blood into heart / ventricles) / eq ;<br>3. during { diastole / atrial systole } / eq ; | (3) |
|-------|---|-----|

|        |   |     |
|--------|---|-----|
| b)(ii) | 1. {middle layer of wall of vessel / eq } / tunica media / in the muscle layer ;<br>2. reference to allows { stretching / recoil / description} ;<br>3. to prevent damage (of the aorta) / eq / {to maintain the pressure of the blood / eq } ; | (3) |
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| 6) | 1. (double) helix ;<br>2. deoxyribose ;<br>3. phosphate / phosphate group;<br>4. phosphodiester / phospho(di)ester / covalent ;<br>5. thymine ;<br>6. guanine ;<br>7. hydrogen ;<br>8. sixteen / 16 ; | (8) |
|----|---|-----|

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|           |  |   |     |
|-----------|--|---|-----|
| 7)<br>(a) | <ol style="list-style-type: none"> <li>idea of large surface area to volume ratio or that it is thin (body) ;</li> <li>idea that this helps diffusion e.g. short diffusion distance, faster diffusion ;</li> </ol> | <ol style="list-style-type: none"> <li>IGNORE flat, small unqualified, thin membrane, thin skin etc<br/>NOT cell wall</li> <li>IGNORE gas exchange<br/>NOT osmosis</li> </ol>   | (2) |
| b)(i)     | <ol style="list-style-type: none"> <li>solubility of oxygen decreases as temperature increases / eq ;</li> <li>credit correct manipulation of figures ;</li> </ol>   | <ol style="list-style-type: none"> <li>ACCEPT converse, negative correlation</li> <li>units not required but if given then they must be correct e.g. 8.2 mg dm<sup>-3</sup> difference in solubility between 0 and 40 °C, solubility halved between 5 °C and 40 °C</li> </ol> | (2) |

|        |  |   |     |
|--------|--|---|-----|
| b)(ii) | <ol style="list-style-type: none"> <li>idea that there is quite a lot of dissolved oxygen in the water at this temperature ;</li> <li>idea of oxygen concentration gradient (between water and flatworm's cells) ;</li> <li>idea of enzyme activity being temperature-dependent ;</li> <li>idea that water below 15°C would be too cold for {enzymes / metabolism / eq} to work effectively ;</li> <li>idea that it is a balance between oxygen availability and {enzyme activity / kinetic effects / eq} ;</li> </ol> | <p>IGNORE there is most oxygen available</p> <ol style="list-style-type: none"> <li>ACCEPT sufficient O<sub>2</sub>, not enough O<sub>2</sub> at higher temps.</li> <li>Ref. to diffusion or gas exchange alone, not sufficient for the mark</li> <li>ACCEPT e.g. 15°C is optimum for their enzymes<br/>NB: This is for linking enzymes and temperature, Mp4 is a development of Mp3 stating something specific.</li> <li>IGNORE ref to effects above 15°C</li> </ol> | (3) |
|--------|--|---|-----|

|     |   |  |     |
|-----|---|--|-----|
| (c) | <ol style="list-style-type: none"> <li>heart needed to {pump / move / eq} blood (around the body) ;</li> <li>reference to mass flow ;</li> <li>idea that many animals have a small surface area to volume ratio ;</li> <li>idea that a circulatory system is needed to overcome limitations of diffusion / eq ;</li> <li>credit correctly named molecule transported (in blood) ;</li> <li>idea that many animals have a high metabolic rate ;</li> </ol> | <ol style="list-style-type: none"> <li>ACCEPT idea that diffusion is not sufficient</li> <li>oxygenated blood not enough by itself<br/>ACCEPT any appropriate molecule in the blood<br/>ACCEPT idea of thermoregulation e.g. heat</li> </ol> | (4) |
|-----|---|--|-----|

|                   |   |                   |     |
|-------------------|---|-------------------|-----|
| 8)                | <table border="1" style="width: 100%; height: 100%;"> <tr> <td style="width: 50%; vertical-align: top;">                     B ;<br/>C ;<br/>A ;                 </td> <td style="width: 50%; text-align: right; vertical-align: bottom;">                     (3)                 </td> </tr> </table> | B ;<br>C ;<br>A ; | (3) |
| B ;<br>C ;<br>A ; | (3)   |                   |     |