

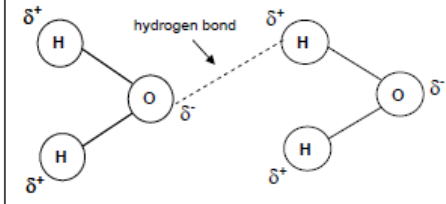
CHERRY HILL TUITION OCR BIOLOGY AS PAPER 10 MARK SCHEME

1)

| | | | |
|----------|---|-------|---|
| (a) | obese ; iron ; haemoglobin ; | 3 | |
| (b) | 24.7 ; ; | 2 | If answer incorrect or to the wrong number of dp, then ALLOW one mark for working: $69 \div 1.67^2$ 24.74 = one mark IGNORE 25 and look for working mark If units are given, they must be kg m^{-2} (or kg/m^2) Max 1 for incorrect units |
| (c) (i) | <u>overweight</u> / borderline <u>overweight</u> ; | 1 | DO NOT CREDIT if more than one answer given |
| (c) (ii) | 1 very close to border / AW ; 2 graph does not distinguish between male and female ; 3 does not measure actual fat / AW ; 4 has, more / less, muscle / bone (than normal) OR (does not take into account) muscle / bone, mass / density / weight ; 5 muscle / bone, heavier / denser, than fat / AW ; 6 pregnant ; | 2 max | 1 DO NOT CREDIT mistake reading graph 4 Must refer to idea of amount of muscle / bone being different from normal. DO NOT CREDIT muscle / bone unqualified CREDIT has osteoporosis as ref. to different bone density |
| (d) | 1 coronary heart disease / CHD / atherosclerosis / angina / coronary thrombosis / myocardial infarction / heart attack / cardiac arrest / cardiovascular disease / stroke ; 2 (osteo)arthritis ; 3 (Type 2) diabetes ; 4 high blood pressure / <u>hypertension</u> ; 5 gallstones ; 6 cancer ; | 2 max | 1 DO NOT CREDIT heart disease alone / arteriosclerosis 2 DO NOT CREDIT rheumatoid arthritis 3 DO NOT CREDIT Type 1 diabetes 6 ACCEPT any type of cancer |

2)

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| | | |
|-----|--|---|
| (a) | <p>1 hydrogen bond represented as, horizontal / vertical, dashed line between O on one molecule and H on the adjacent molecule ;</p> <p>2 hydrogen / H, bond label (on any drawn bond between 2 molecules) ;</p> <p>3 (delta positive) δ^+ on each drawn H <u>and</u> (delta negative) (2) δ^- on each drawn O ;</p> |  <p>1 DO NOT CREDIT if >1 H bond is drawn between the same two molecules</p> <p>3 if both molecules drawn, δ^+ and δ^- on all atoms. ACCEPT d (lower case) for δ</p> <p>3</p> |
| (b) | <p><i>ice floats</i></p> <p>P1 (ice less dense because) molecules spread out ;</p> <p>P2 molecules form, crystal structure / lattice / AW ;</p> <p>P3 ice forms insulating layer / clearly described ;</p> <p>P4 water (below ice), does not freeze / still liquid / remains water / kept at higher temperature ;</p> <p>S1 organisms do not freeze ;</p> <p>S2 animals / organisms, can still, swim / move ;</p> <p>S3 allows, currents / nutrients, to circulate ;</p> <p><i>solubility</i></p> <p>P5 ions / named ion, polar / charged ;</p> <p>P6 ions / named ion, attracted to / bind to / interact with, water;</p> <p>S4 (named) organisms / plants / animals, uptake / AW, minerals / named mineral / nutrients ;</p> <p>S5 correct use of named, mineral / nutrient, in organism ;</p> | <p>P3 e.g. acts as a barrier to the cold</p> <p>S1 DO NOT ACCEPT die (because 'survival' stated in stem)</p> <p>S4 ACCEPT obtain / enters / goes in / gets</p> <p>S5 needs to be more specific than 'for growth / metabolism' suitable examples include but are not limited to: nitrates for amino acids / protein / (named) nucleic acid / phosphate for ATP / phospholipids / plasma membrane / magnesium for chlorophyll etc</p> |
| | <p>P7 <i>temperature stability</i> many / stable, (hydrogen) bonds between molecules ;</p> <p>P8 at lot of energy to, force apart molecules / break bonds ;</p> <p>P9 high (specific) <u>heat capacity</u> ;</p> <p>S6 temperature does not change much / small variation in temperature ;</p> <p>S7 effect of temperature on , enzymes / metabolic rate ;</p> <p>S8 gases remain soluble ;</p> <p>H <i>Award once in any section</i> hydrogen bonds ;</p> | <p>P7 Many hydrogen bonds between molecules = 2 marks (gets P7 and H)</p> <p>P8 ACCEPT heat as alternative to energy</p> <p>P9 DO NOT CREDIT latent heat capacity</p> <p>S6 could refer to organisms or surrounding water ACCEPT stays cool in summer / stays warm in winter DO NOT CREDIT constant alone</p> <p>S7 ACCEPT any reference to temperature affecting enzyme activity / metabolic rate</p> <p>DO NOT CREDIT if in incorrect context (e.g. they are strong bonds)</p> <p>7 max</p> |
| | <p>QWC - Award if you see a P mark and an S mark within the same section ;</p> | <p>1</p> <p>Look for the S mark first, then award QWC if there is a P mark in the same section in the mark scheme</p> |
| (c) | <p>hydrolysis / hydrolytic ;</p> <p>hydrophilic ;</p> | <p>ACCEPT phonetic spelling throughout</p> <p>IGNORE head</p> |

3)

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|-----|-------|---|-------|--|
| (a) | (i) | X ; | 1 | |
| (a) | (ii) | <p>1 substrate / PABA, and, inhibitor / sulfonamide, similar shape; 2 able to, bind / fit into / block, <u>active site</u> ; 3 (shape) <u>complimentary to active site</u> ; 4 both have, hex / benzene / 6-C, (ring) ; 5 both have, NH₂ / amine ; 6 correct ref to a difference between sulfonamide and PABA ;</p> | 3 max | <p>1 ACCEPT similar structure DO NOT CREDIT same shape 3 DO NOT CREDIT refs to PABA and sulfonamide being complementary to each other or to the enzyme (alone) 6 e.g. only sulfonamide contains S sulfonamide has 1 more NH₂ group sulfonamide has SONH₂ but PABA has N₂ only PABA has COOH group</p> |
| (b) | (i) | <p><i>without inhibitor</i> 1 more, PABA / substrate, molecules enter <u>active site</u> ; 2 more, enzyme substrate complexes / ESCs, formed ; 3 at low concentration not all active sites occupied / at high concentration all active sites occupied ; 4 achieves / reaches, max (turnover) rate / V_{max} ; 5 (at high substrate concentration) enzyme <u>concentration</u> limiting ;</p> | 3 max | <p>1 ACCEPT more successful collisions between substrate and active site 3 ACCEPT active sites filled / no free active sites DO NOT CREDIT active sites run out 4 ACCEPT 'cannot work any quicker' DO NOT CREDIT 'optimum rate' or 'rate levels off'</p> |
| (b) | (ii) | <p><i>with inhibitor</i> 1 inhibitor / sulfonamide, can, fit / block / bind to / compete for, <u>active site</u> ; 2 (occupies it) for a short time / temporary / reversibly ; 3 fewer active sites available (for substrate) / AW ; 4 (idea of) more substrate reduces chance of inhibitor getting in;</p> | 2 max | <p>3 ACCEPT substrate can't access active site 4 ACCEPT more ESC formed in context of overcoming inhibition / substrate can out-compete inhibitor</p> |
| (c) | | <p>1 mutation ; 2 sulfonamide is <u>selective</u>, agent / pressure ; 3 resistant survive / non resistant die ; 4 (resistance) allele / gene / mutation, passed to, offspring / next generation ; 5 (happens) over many generations ; 6 AVP ;</p> | 4 max | <p>DO NOT CREDIT immune for any mark point 3 IGNORE refs to (survivors) breed / reproduce ; 5 IGNORE refs to time. Look for generations 6 e.g. mutation is, random / spontaneous allele / gene, passed on by, plasmids / horizontal transmission</p> |
| (d) | (i) | <p><u>bacteria</u>, killed / destroyed / cannot grow / lyse, in presence of antibiotic ;</p> | 1 | DO NOT CREDIT 'antibiotic works better' or 'there are no bacteria there' or 'bacteria are broken down' |
| (d) | (ii) | streptomycin ; | 1 | IGNORE '4' as it is the number rather than the name |
| (d) | (iii) | <p>1 cheap / AW ; 2 (test is) quick to carry out / (deals with several antibiotics) at same time / AW ; 3 (idea of) allowing early treatment of patient ; 4 (idea of) compares antibiotics under same conditions ; 5 (correct antibiotic first time) to prevent antibiotic resistance developing ;</p> | 3 max | <p>DO NOT CREDIT responses which simply refer to selecting the best antibiotic 2 DO NOT CREDIT speed of antibiotic action</p> |
| (e) | | <p>(new) drugs come from (named) organisms ; biodiversity is reducing ; habitats / named habitat, destroyed / lost ; <u>reason</u> for habitat destruction ;</p> | 2 max | <p>ACCEPT plants / animals / fungi / species / etc. ACCEPT deforestation / natural environment <u>lost</u> e.g. global warming logging fuel crops construction / industrialisation mining fishing pollution tourism ACCEPT any other valid reason that will destroy natural habitats but not general statements such as 'human development' or 'business'</p> |

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4)

| | | | | |
|-----|------|--|-------|---|
| (a) | (i) | (diagram shows that some) individuals have more than one risk factor ; | 1 | DO NOT CREDIT CHD is multifactorial |
| (a) | (ii) | <p>1 high, saturated / animal, fat diet ;</p> <p>2 high salt intake ;</p> <p>3 (diet) low in (named) antioxidants / vitamin A / vitamin C / vitamin E ;</p> <p>4 obesity ;</p> <p>5 genetic / heredity / inherited / ethnicity / race ;</p> <p>6 gender / sex ;</p> <p>7 excess alcohol consumption ;</p> <p>8 (increasing) age ;</p> <p>9 diabetes ;</p> <p>10 stress ;</p> | 2 max | <p>Mark the 1st answer on each numbered line.</p> <p>1 ACCEPT absence of polyunsaturated fats</p> <p>7 must indicate, excess / high levels</p> |

| (a) | (iii) | <table border="1"> <thead> <tr> <th>effect</th> <th>nicotine</th> <th>carbon monoxide</th> </tr> </thead> <tbody> <tr> <td>increases heart rate</td> <td>✓</td> <td></td> </tr> <tr> <td>constricts arterioles</td> <td>✓</td> <td></td> </tr> <tr> <td>damages the lining of arteries</td> <td></td> <td>✓</td> </tr> <tr> <td>reduces the ability of haemoglobin to carry oxygen</td> <td></td> <td>✓</td> </tr> <tr> <td>makes platelets sticky</td> <td>✓</td> <td></td> </tr> </tbody> </table> | effect | nicotine | carbon monoxide | increases heart rate | ✓ | | constricts arterioles | ✓ | | damages the lining of arteries | | ✓ | reduces the ability of haemoglobin to carry oxygen | | ✓ | makes platelets sticky | ✓ | | 4 | <p>DO NOT CREDIT hybrid ticks</p> <p>IGNORE crosses in the 'blank' boxes</p> |
|--|----------|--|--------|----------|-----------------|----------------------|---|--|-----------------------|---|--|--------------------------------|--|---|--|--|---|------------------------|---|--|---|--|
| effect | nicotine | carbon monoxide | | | | | | | | | | | | | | | | | | | | |
| increases heart rate | ✓ | | | | | | | | | | | | | | | | | | | | | |
| constricts arterioles | ✓ | | | | | | | | | | | | | | | | | | | | | |
| damages the lining of arteries | | ✓ | | | | | | | | | | | | | | | | | | | | |
| reduces the ability of haemoglobin to carry oxygen | | ✓ | | | | | | | | | | | | | | | | | | | | |
| makes platelets sticky | ✓ | | | | | | | | | | | | | | | | | | | | | |

| | | | | |
|-----|--|--|-------|---|
| (b) | | <p>1 damage to <u>endothelium</u> ;</p> <p>2 LDLs <u>contain</u>, saturated fat / cholesterol ;</p> <p>3 LDLs collect at site of damage ;</p> <p>4 fatty substances / cholesterol / LDLs, deposited, <u>in</u> artery wall / <u>under</u> endothelium ;</p> | 2 max | <p>2 DO NOT CREDIT moves / transports</p> <p>CREDIT LDLs are <u>protein</u> and saturated fat / cholesterol</p> <p>3 must be stated</p> <p>4 ACCEPT fats / lipids</p> <p>ACCEPT under lining of artery wall</p> <p>DO NOT CREDIT veins / vessels / capillaries</p> |
| (c) | | <p>1 increases size / AW, of <u>lumen</u> ;</p> <p>2 increases / eases / decreases resistance to, blood flow ;</p> <p>3 (therefore) more, O₂ / glucose ;</p> <p>4 for <u>aerobic</u> respiration ;</p> <p>5 in, heart <u>muscle</u> / cardiac <u>muscle</u> / myocardium ;</p> <p>6 more CO₂ removed ;</p> | 4 max | <p>1 ACCEPT reduces blockage in lumen</p> <p>2 ACCEPT 'more blood' / 'blood flows more freely' / 'blood flows as normal' / 'quicker blood flow'</p> <p>3 needs idea of more oxygen (than before operation)</p> <p>CREDIT idea of preventing oxygen starvation</p> <p>'more oxygenated blood' gets mark points 2 and 3</p> |

5)

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| | | | | |
|-----|------|--|-------|---|
| (a) | (i) | tidal volume ; | 1 | |
| | (ii) | being stretched / stretching ; | 1 | ACCEPT lengthening DO NOT CREDIT relaxing IGNORE expanding 'stretching and contracting' = CON |
| (b) | | <p><i>between B & C expiration:</i></p> <p>1 (external) intercostal muscles / diaphragm, relax ;</p> <p>2 rib cage / ribs, move down OR diaphragm, moves / pushed, up ;</p> <p>3 volume of, thorax / chest cavity / lungs, drops / decreases ;</p> <p>4 pressure inside, thorax / chest cavity / lungs, increases ;</p> <p>5 above, external / atmospheric, pressure ;</p> <p>6 air leaves down pressure gradient ;</p> <p>7 (elastic) recoil of alveoli ;</p> <p>3 max</p> <p>QWC – two technical terms used in context and spelt correctly ; 1</p> | 4 max | <p>1 ACCEPT ref to <u>internal</u> intercostal muscles contracting</p> <p>1 DO NOT CREDIT ref to diaphragm relaxing and intercostal muscles (unqualified) contracting</p> <p>2 IGNORE 'diaphragm becomes domed / curved'</p> <p>3 ACCEPT 'space inside' or 'air in' for volume</p> <p>5 ACCEPT (pressure) higher than outside</p> <p>Answers given in context of 'at B' or 'at C' – <u>QWC not awarded.</u></p> <p>Any two from intercostal, diaphragm, recoil, volume thorax, pressure, gradient</p> |
| (c) | | 12 ;; | 2 | <p>Allow two marks for correct answer.</p> <p>If answer wrong allow one mark for working</p> <p>$\frac{60}{5}$</p> |
| (d) | | <p><i>idea that:</i></p> <p>thorax / rib cage / lungs, cannot be completely, compressed / flattened ;</p> <p>trachea / bronchi, held open by cartilage ;</p> <p>bronchioles / alveoli, held open by elastic fibres ;</p> <p>AVP ;</p> | 2 max | <p>IGNORE bronchioles or alveoli</p> <p>IGNORE bronchi or trachea</p> <p>eg absence of pressure gradient / atmospheric and thoracic pressures equal presence of surfactant in alveoli upward movement of diaphragm limited by collagen fibres</p> |

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| | | |
|-----|--|--|
| (a) | <p><i>habitat</i></p> <p>1 the place where, an organism / organisms / a population / a community, lives ; 1 max</p> <p><i>biodiversity</i></p> <p>2 variety of life / the range of living organisms found / AW ;</p> <p>3 variety / range, of, habitats / ecosystems ;</p> <p>4 number of different species ;</p> <p>5 variety / genetic diversity, within species ; 2 max</p> | <p>1 ACCEPT animal or plant ACCEPT location / environment / area DO NOT CREDIT ecosystem</p> <p><i>max 2 for biodiversity</i></p> <p>2 DO NOT CREDIT ref to variation ACCEPT species richness / species diversity</p> <p>4 must have ref to number / how many / etc.</p> |
| (b) | <p>not random / should have been random ; unrepresentative / skewed / biased, results ; creates an over-estimate of diversity ; may miss some (dominant) species / does not cover full range of species ;</p> | <p>DO NOT CREDIT ref to 'fair test' unless qualified</p> <p>'misleading' is not quite good enough</p> <p>CREDIT plant / animal instead of species</p> |
| (c) | (i) | <p>remove units from the body of the table and put units in column heading / AW ;</p> |
| (c) | (ii) | <p>bell shaped ;</p> <p>peak / highest point, for line between peaks for bracken and cotton grass (on horizontal axis) ; peak / highest point, for line lower than both bracken and cotton grass (on vertical axis) ;</p> |
| (c) | (iii) | <p>1 absent at bottom of slope / present at top of slope ;</p> <p>2 amount of bracken / percentage cover, increases with increasing distance ;</p> <p>3 comparative figs. with units ;</p> |
| (d) | (i) | <p>record / identify / list / AW, all species / (all) other plants ;</p> <p>(count / estimate) numbers of individuals within each species / AW ;</p> |
| (d) | (ii) | <p>not stable / at risk / low ability to withstand change / AW ; more likely to lose species ;</p> |

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6)

| | | | | | | | | | | | | | |
|---------------------------|---------------------------|---|---------------------------|---|---------------------------|---------------------------|--|--|---------------------------|--|-----|---|---|
| (a) | | <table border="1"> <tr> <td></td> <td>open circulatory system</td> <td>closed circulatory system</td> </tr> <tr> <td>single circulatory system</td> <td></td> <td></td> </tr> <tr> <td>double circulatory system</td> <td></td> <td>✓ ;</td> </tr> </table> | | open circulatory system | closed circulatory system | single circulatory system | | | double circulatory system | | ✓ ; | 1 | ACCEPT cross / other mark DO NOT CREDIT if a tick is placed in more than one box |
| | | open circulatory system | closed circulatory system | | | | | | | | | | |
| | single circulatory system | | | | | | | | | | | | |
| double circulatory system | | ✓ ; | | | | | | | | | | | |
| (b) | (i) | <p>systole / contraction, increases pressure ;</p> <p>diastole / relaxation/ blood flowing onwards, decreases pressure ;</p> <p>(contraction of) ventricle, muscle / wall ;</p> <p>left (ventricle) ;</p> | 2 max | <p>IGNORE 'the heart' or 'the heart beating' or 'the heart pumping' without further qualification</p> <p>IGNORE ref to right (side) for mp 1 - 3</p> <p>ACCEPT ref to peak on graph for increasing pressure</p> <p>ACCEPT ref to trough on graph for decrease in pressure</p> <p>ACCEPT ventricular systole</p> <p>'contraction of left ventricle' = 1 mark 'contraction of muscle in left ventricle' = 2 marks 'ventricular systole increases pressure' = 2 marks</p> | | | | | | | | | |
| | (ii) | pulse / heart, <u>rate</u> ; | 1 | IGNORE heart beat / beats per minute | | | | | | | | | |
| (c) | | <p><i>marks for pressure change:</i></p> <p>pressure drops, as distance from heart increases ;</p> <p>greatest / rapid / significant, pressure drop while blood is in the arteries ;</p> <p>pressure, constant / does not drop, in veins ;</p> <p><i>marks for amplitude of fluctuations:</i></p> <p>fluctuation / AW, decreases from aorta to arteries ;</p> <p>no fluctuation in, capillaries / veins ;</p> <p>use of comparative figures with unit ;</p> | 3 max | <p>ACCEPT from aorta to arteries / correctly named blood vessels – look for decrease in pressure trend</p> <p>ACCEPT plateaus / level</p> <p>IGNORE ref to frequency of fluctuations</p> <p>ACCEPT 'smaller fluctuations in artery'</p> <p>correct figures must be quoted from the graph to back up <u>one</u> point – correct unit used at least once. eg 'peak to peak', between aorta and arteries, falls 18.5 to 14 kPa pressure in aorta between 18.5 and 12.5 kPa pressure in arteries drops from 12.5 to 5 kPa pressure in capillary drops from 5 to 0.5 kPa overall drop from 18.5 to 0.5 kPa</p> <p><i>Any other figures must be checked against graph</i></p> <p>ACCEPT correct calculated figure eg pressure drops 6kPa in aorta</p> | | | | | | | | | |
| (d) | (i) | <p>blood flows into <u>larger</u> number of vessels ;</p> <p>(total) cross-sectional area of the <u>arteries</u> is greater than the aorta ;</p> <p>(total) cross-sectional area of the <u>capillaries</u> is greater than the, aorta / <u>arteries</u> ;</p> | | <p>IGNORE ref to pressure fluctuations and structure of vessel walls as not relevant to overall pressure change</p> <p>ACCEPT idea of vessels branching to many/more (smaller) vessels</p> <p>IGNORE ref to lumen size</p> | | | | | | | | | |
| | | <p>capillary (wall) is, thin / only one cell thick ;</p> <p>(high pressure would) burst / damage, capillary (wall) ;</p> <p>reduce chance of, tissue fluid build up / oedema ;</p> | 2 max | <p>IGNORE ref to rate of flow</p> <p>IGNORE ref to capillary walls small / made of squamous cells</p> <p>ACCEPT cannot withstand (high) pressure</p> | | | | | | | | | |

