

| Question Number | Answer | Mark |
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| 1(a)(i) | 1. both h ose molecules in disaccharide correctly drawn ; 2. indication that water is formed ; 3. gly sidic bond correctly drawn ; | (3) |

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|-----------------|---------------------------------|------|
| 1(a)(ii) | condensation / polymerisation ; | (1) |

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| 1(a)(iii) | (1, 4) glycosidic (bond / link) ; | (1) |

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| 1(b)(i) | A ; | (1) |

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|-----------------|--------|------|
| 1(b)(ii) | B ; | (1) |

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| 1(b)(iii) | B ; | (1) |

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|-----------------|--|------|
| 1(c)(i) | 1. genotypes of parents correctly shown ; 2. alleles present in gametes correctly shown ; 3. possible phenotypes of offspring correctly shown ; 4. probability stated as {0.5 / 50% / 1 in 2 / $\frac{1}{2}$ / 50:50} ; | (4) |

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| 1(c)(ii) | The same (as the probability is for the first child) ; | (1) |

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| 2(a) | <ol style="list-style-type: none"> 1. idea that enzymes are proteins ; 2. reference to transcription ; 3. gene / eq ; 4. reference to mRNA ; 5. reference to translation (of mRNA) ; 6. reference to genetic code / eq ; 7. reference to {ribosome / polysomes} ; 8. reference to tRNA ; 9. idea that amino acids bonded / polypeptide produced ; | max (4) |

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| 2(b) | <ol style="list-style-type: none"> 1. adrenoceptors are {proteins / glycoproteins} ; 2. phospholipids can move in the membrane / eq ; 3. can be {added to / removed from / move around in} {phospholipid bilayer / membrane} ; 4. adrenoceptors can interact with phospholipids e.g. {hydrophobic / hydrophilic} interactions ; | max (2) |

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| 2(c) | <ol style="list-style-type: none"> 1. {incomplete / insufficient} data / eq ; 2. different interpretations of data / eq ; 3. & 4. credit any two examples from the text e.g. evidence from noradrenaline, electrical stimulation, multifactorial problem, antidepressant drugs, pain killers, gender ; ; | max (3) |

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| *2(d)(i) | <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> <p>Drug therapy</p> <ol style="list-style-type: none"> 1. idea that it affects the whole brain ; 2. idea that it is difficult to get dose right ; <p>DBS (Deep Brain Stimulation)</p> <ol style="list-style-type: none"> 3. targets specific area of the brain / eq ; 4. relieves tremors /eq ; 5. has effects on {other areas of the brain / other cell types} ; 6. has short term side effects e.g. laughing, crying ; 7. has long term side effects e.g. depression, mood swings, suicidal tendencies ; 8. invasive procedure has risk / eq ; <p>Gene therapy</p> <ol style="list-style-type: none"> 9. corrects chemical imbalance / eq ; 10. precise group of cells affected / eq ; <p>Light therapy</p> <ol style="list-style-type: none"> 11. very precise effects / eq ; 12. requires genetic modification / eq ; 13. genes from different species / eq ; <p>General (Gene or light therapy)</p> <ol style="list-style-type: none"> 14. dangers of using virus as vector / eq ; 15. ethical issues of genetic modification / eq ; | <p>max (7)</p> |

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| 2(d)(ii) | <ol style="list-style-type: none"> 1. both caused by {lack / eq} of neurotransmitter ; 2. Parkinson's {lack / eq} of dopamine ; 3. depression {lack / eq} of serotonin ; | max (2) |

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| 2(e) | <ol style="list-style-type: none"> 1. light affects pigments / eq ; 2. rhodopsin / iodopsin (in mammals) ; 3. (changes in pigment) result in action potentials / nerve impulses / eq ; 4. pigments (in cones) respond to {specific / eq} wavelength / eq ; | max (3) |

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| 2(f) | <ol style="list-style-type: none"> 1. virus acts as a vector ; 2. reference to human cold virus ; 3. virus has specific surface proteins / eq ; 4. match surface{proteins / receptors / eq} of target cell ; 5. binding to surface protein promotes entry to cell / eq ; 6. idea that genes can be incorporated into {host DNA / eq} | max (3) |

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| 2(g) | <ol style="list-style-type: none"> 1. {causes / involved in / eq} inflammation / eq ; 2. vasodilation / eq ; 3. increased blood flow / eq ; 4. increased {permeability / leakage} of blood vessels ; 5. Oedema / swelling / eq ; 6. reference to temperature increase ; 7. reference to histamine / mast cells ; 8. idea that phagocytes / macrophages move to site ; | <p style="text-align: right;">max (2)</p> |

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| 2(h) | <ol style="list-style-type: none"> 1. representative sample / eq ; 2. (sufficiently) large sample / eq ; 3. double blind testing ; 4. reference to placebo ; 5. objective measurement of effects / eq ; 6. (collecting / analysing) separate data sets for males and female / eq ; 7. other factors need to be {controlled / measured} e.g. hormone levels in females, socioeconomic, nutrition ; 8. reference to other models e.g. animals, tissue culture ; 9. appropriate comment on safety issues e.g. toxicity ; 10. consideration of time e.g. between dose and observation, long term data ; | max (4) |