Question Number	Answer	Additional Guidance	Mark
*1(a)(i)	(QWC – spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. multiple copies of DNA made / eq ; 2. using {PCR / *polymerase chain reaction*} ; 3. credit any correct detail of PCR ; 4. reference to *restriction* {*enzymes* / *endonucleases*} to produce DNA {*fragments* / eq} ; 5. reference to (*gel) electrophoresis* ; 6. idea of {loading / eq} the DNA onto the {*gel* / named *gel*} ; 7. idea that an {*electric current* / charge} is applied ; 8. reference to use of {*dye* / *fluorescent tag* / *UV light* / *Southern blotting* / *gene probes* / *radioactive labelling* / eq};	QWC emphasis on spelling 1. IGNORE refs to amplification, large amounts 3. .g. step 1: 90 to 95 ^{o}C, step 2: 50 to 65 ^{o}C, step 3: 70 to 80 ^{o}C, use of {*primers* / DNA *polymerase* / *nucleotides*}, many repetitions 6. e.g. *agarose, agar* 7. ACCEPT apply *potential difference*	**(6)**

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	1. idea of comparing total number of {bands / eq} ; 2. idea of comparing position of {bands / eq} ; 3. idea of comparing {size / width} of {bands / eq} ;	ACCEPT idea of comparing bands for 1 mark if mps 1, 2 or 3 cannot be awarded ACCEPT bars / blocks	**(3)**

Question Number	Answer	Additional Guidance	Mark
1(b)	1. {scientific / peer reviewed} {papers / journals / magazines / article} ; 2. (scientific) {conferences / lecture / forums} ; 3. media reports ;	3. e.g. TV, radio, newspaper, internet	**(2)**

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Comments</th><th>Mark</th></tr>
<tr><td>2(a)</td><td>
<table>
<tr><th>Feature</th><th>Cellulose molecule</th><th>Cellulose microfibril</th></tr>
<tr><td>Alpha (α) glucose</td><td>×</td><td></td></tr>
<tr><td>1,4- glycosidic bonds</td><td>✓</td><td>✓</td></tr>
<tr><td>1,6- glycosidic bonds</td><td>×</td><td></td></tr>
<tr><td>Hydrogen bonds</td><td>×</td><td>✓</td></tr>
</table>
Any 2 correct for 1 mark ;;;;
</td><td>No marks for blank spaces.
No marks for hybrid x/✓</td><td>(4)</td></tr>
</table>

Question Number	Answer	Additional Comments	Mark
2(b)	1. Archaea ; 2. Bacteria ;	Either way around 1. CCEPT Archaeobacter	**(2)**

Question Number	Answer	Additional Comments	Mark
2(c)	1. idea that organisms with { specific / particular / shared / common / similar / eq } { characteristics / features / traits / eq } are placed in a group ; 2. detail of how characteristics assessed, e.g. observable characteristics, behavioural similarities, similarities in DNA, molecular phylogeny ;		**(2)**

Question Number	Answer	Additional Comments	Mark
2(d)	1. scientific findings published e.g. in a journal ; 2. idea of presented at scientific conference / eq ; 3. idea of peer review ; 4. (other scientists) repeat experiments (to confirm or validate findings / test reliability of data) ;	IGNORE 'critically evaluated' as it is in the stem of the question 3. 'peer reviewed journa gains Mp1 as well 4. m t be an indication of further testing being carried out	**(3)**

Question Number	Answer	Additional Comments	Mark
3(a)	☒ C Archaea, Bacteria and Eukarya ;		(1)

Question Number	Answer	Additional Comments	Mark
3(b) (i)	1. published in { scientific paper / journal } / eq ; 2. at a conference / presentation / eq ;	1. IGNORE online, internet ACCEPT scientific magazine	(2)

Question Number	Answer	Additional Comments	Mark
3(b) (ii)	1. idea of peer review ; 2. idea of repeating experiments to confirm or validate findings ;	2. m t be an indication of further testing being carried out	(2)

Question Number	Answer	Additional Comments	Mark
3 (c)	1. idea that organisms with { specific / particular / shared / common / similar / eq } { characteristics / features / traits / eq } are placed in a group ; 2. idea that taxonomic groups have specific differences ; 3. idea that phylogeny describes {evolutionary / genetic} relationship ; 4. idea that molecular phylogeny based on similarities in { DNA / DNA sequence / proteins / eq } ;	4. IGNOR gene sequence	(4)

Question Number	Answer	Additional Guidance	Mark
4(a)(i)	1. (successful interbreeding) produces offspring; 2. (same species produce) fertile (offspring); 3. credit reason why offspring of different species might be infertile ;	**Accept** converse throughout **Ignore** viable eg genetic incompatibility, different number of chromosomes, poor quality gametes , low number of gametes	**(3)**

Question Number	Answer	Additional Guidance	Mark
4(a)(ii)	1. reference to reproductive isolation ; 2. different breeding times; 3. do not recognise {courtship displays / songs / eq} ; 4. physically incompatible eg genitalia ;		**(3)**
Question Number	**Answer**	**Additional Guidance**	**Mark**
4(b)	1. idea that the two species share the same habitat ; 2. idea that the two species experience the same environmental conditions ; 3. (therefore) the same selection pressures ; 4. idea that they are both well-adapted (to their environment) ; 5. idea that no mutations have happened that {improve / change} their {phenotypes / survival}; 6. {no / few} changes in allele frequency / gene pool is stable ; 7. idea that there has been very little change in environment (over the years) ;	**Accept** similar **NB** this needs to be in the context of both species being subjected to the same selection pressures **Accept** similar	**(3)**

Question Number	Answer	Mark
5 (a)(iv)	1. idea of {checking his methods / repeating experiments / eq} ; 2. to collect more data /review his data / test his results / eq ; 3. to see if his results could be replicated / check reliability of data / eq ;	**(2)**

Question Number	Answer	Mark
5 (b)	<table><tr><th rowspan="2">Feature</th><th colspan="2">Domain</th></tr><tr><th>Bacteria</th><th>Eukaryota</th></tr><tr><td>Ribosomes</td><td>✓</td><td>✓</td></tr><tr><td>Smooth endoplasmic reticulum</td><td>×</td><td>✓</td></tr><tr><td>Cell (surface) membrane</td><td>✓</td><td>✓</td></tr><tr><td>Slime capsule</td><td>✓</td><td>×</td></tr></table> ;;;; Any two correct for one mark	**(4)**