Question Number	Answer	Mark
1 (a)(i)	D ;	**(1)**

Question Number	Answer	Mark
1 (a)(ii)	C ;	**(1)**

Question Number	Answer	Mark
1 (a)(iii)	A ;	**(1)**

Question Number	Answer	Mark
1(b)	1. a increase in temperature increases the permeability / eq ; 2. i a of change in {colour / permeability} related to {42 ^{o}C / 64 ^{o}C} OR no change up to 42 ^{o}C ;	**(2)**

Question Number	Answer	Mark
1(c)(i)	Any **two** from: 1. ference to pre-treatment e.g. rinsing method ; 2. {size / mass / surface area / volume / shape} of beetroot ; 3. b troot storage conditions / eq ; 4. {sa / type / species / eq} beetroot ; 5. {age of beetroot / storage time} ; 6. (cubation) time / eq ; 7. {vol e / concentration / eq} of {water / solution}(added to beetroot) ; 8. pH	**(2)**

Question Number	Answer	Mark
1(c)(ii)	1. ference to repeats / replicates / eq ; 2. i a that (colorimeter / readings) are {objective / quantitative / not qualitative / more accurate / provide numbers / more precise / measured not judged / eq} ;	**(2)**

Question Number	Answer	Mark
1(c)(iii)	1. (p k colour due to) {pigment / dye /betalain / eq} ; 2. idea that this is released when {cells / vacuoles/ membranes} are damaged ; 3. and ad not been washed off / eq ; ACCEPT converse argument when clear	**(2)**

Question Number	Answer	Mark
1(c)(iv)	idea that the second experiment shows that the permeability increases between {5 / 22} ^{o}C and 42 ^{o}C / in first experiment 5 ^{o}C has an effect / eq **OR** idea that the second experiment's results are quantified ;	**(1)**

Question Number	Answer	Mark
2(a)	1. protein glycoprotein ; 2. facilita d diffusion ; 3. active transport / e ; 4. ATP / enosine triphosphate ;	**(4)**

Question Number	Answer	Mark
2(b)(i)	1. 77 0 / 7; 2. correct division y 77 (multiplied by 100) to give correct answer, e.g. 9.1 / 9.09 / 9.0 / 9 [CE applies] Correct answer = 2 marks	**(2)**

Question Number	Answer	Mark
2(b)(ii)	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) ; 2. loss of mass of strawberries not as high as it should have been / eq ; 3. (%) value too small / eq ; OR 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 ; 2. loss of mass of strawberries higher than it should have been / eq ; 3. (%) value too high / eq ;	**(3)**

Question Number	Answer	Mark
2(b)(iii)	1. correct reference to <u>water</u> gradient (between sugar and strawberries) ; 2. reference to osmosis (of water from inside of strawberry to outside) ; 3. idea that water is found in {cytoplasm / vacuoles} (of strawberry) ; 4. reference to water as a solvent (for the sugar) ; 5. reference to (di)polar nature of water / eq ;	**(3)**

Question Number	Answer	Mark
***3(a)QW**	(QWC – Spelling of technical terms *(shown in italics)* must be correct and the answer must be organised in a logical sequence) 1. appropriate tissue named e.g. beetroot ; 2. reference to {washing / soaking} {beetroot / eq} (thoroughly) ; 3. reference to waterbath (to maintain / change temperature) ; 4. reference to {range / at least 5] {temperatures / alcohol concentrations} ; 5. appropriate controlled variable named e.g. length of time, size of beetroot ; 6. indication of what is being used to judge permeability colour of solution, absorbance, transmission ; 7. description of how permeability can be assessed e.g. use of colorimeter, standard solutions ; 8. reference to repeats / replicates ;	**max (5)**

Question Number	Answer	Mark
3(b)(i)	no {relationship / correlation} eq ;	**(1)**

Question Number	Answer	Mark
3(b)(ii)	permeability of cell membrane increases as the solubility (in oil relative to water) increases / eq ;	**(1)**

Question Number	Answer	Mark
3(b)(iii)	1. circle drawn in top left quarter of graph ; 2. {circle/dot} drawn is equal to or smaller than smallest printed circle, e.g. fits within one square ;	**(2)**

Question Number	Answer	Mark
3(b)(iv)	1. reference to phospholipid bilayer ; 2. reference to hydrophobic nature (of bilayer / tails) ; 3. idea that {non-polar molecules / molecules that have high solubility in oil compared with water} will pass through the membrane more readily **OR** idea that {polar molecules / molecules with low solubility in oil relative to water} will pass through less readily ; 4. idea that permeability linked to readiness to dissolve ; 5. reference to {fluidity / movement} of phospholipids ;	**max (3)**

Question Number	Answer	Mark
4(a)(i)	1. phospholipids ; 2. phosphate (head) ; 3. (two) fatty acid (tails) ; 4. reference to location of glycerol ; 5. correct reference to ester bonds ;	**max (3)**

Question Number	Answer	Mark
4(a)(ii)	1. reference to {hydrophilic / polar / charged} part ; 2. reference to {hydrophobic / non polar / uncharged} part ; 3. reference to orientation of molecule in relation to water; 4. idea that aqueous environment is {on two sides / cytoplasm and {environment / tissue fluid / eq}} ;	**max (3)**

Question Number	Answer	Mark
4(b)	**Active transport:** 1. idea that molecule {binds / fits into} {protein / carriers} ; 2. idea that {protein / carrier} changes shape ; 3. (molecules move) against a concentration gradient / eq ; 4. reference to use of {ATP / energy} ; [Submax 2 marks] **Facilitated diffusion:** 5. reference to proteins as {channels / gates / pores / carriers} ; 6. idea that {channels can open or close / carriers change shape} ; 7. for {large / polar / charged} molecules (to pass through membrane) ; 8. (molecules move) down a concentration gradient / eq ; [Submax 2 marks]	**max (3)**

Question Number	Answer	Mark
4(c)(i)	1. idea that both types of protein in fused cell in correct context ; 2. idea that the proteins are {intermingled / mixed / eq} ; 3. same original number of protein / eq ;	**max (2)**

Question Number	Answer	Mark
4(c)(ii)	1. idea that {phospholipids / molecule A} allow {fluidity / movement/ eq} ; 2. idea that {fluidity / movement / eq} allow membranes to fuse; 3. idea that {fluidity / movement / eq} allows protein to {move / intermingle / eq} ;	**max (2)**