

Question number	Answer	Marks	Guidance
1	D;	1	
2 (a) (i)	protein without, prosthetic / non-protein, group;	2	
2 (a) (ii)	primary; secondary; tertiary / quaternary;	3	1 mark per protein structure
2 (b)	glycoproteins; cell, recognition / identification / signalling / adhesion / receptors; channel proteins; transport by facilitated diffusion; carrier proteins; active transport;	5	Max 2 per protein type.
3 (a)	use beetroot; contains betalain dye; cut beetroot into small cubes; place in water at different temperatures; (at least) 5 different temperatures; sample water after set time ; use filter in colorimeter; zero colorimeter ; (for each sample) record, absorbance / transmission;	6	Max 6
3 (b) (i)	use the same beetroot; same area of beetroot; use cubes of the same size; same volume of water;	2	
3 (b) (ii)	repeat (at least) three times at each; temperature; identify anomalies; calculate mean;	2	
3 (c)	alcohol disrupts cell membrane; of bacteria; (helps) prevent infection;	3	
4 (a)	positive correlation; as lipid solubility increased so did permeability; quoted figures;	2	
4 (b)	no correlation; molecule size does not affect permeability; lipid solubility is more important than size;	3	
5 (a) (i)	only certain ions / molecules can cross cell membranes; <b>ORA</b> (or reverse argument) depends on, size / charge / presence of transport proteins; semi -permeable does not give the idea of selectivity; <b>ORA</b>	2	
5 (a) (ii)	should be, cell surface / plasma, membrane;	1	
5 (b)	water molecules are small; moving fast; between phospholipid molecules; through transient gaps;	2	Max 2
6	1 active transport requires ATP ; at low temperatures: 2 (molecules have) little kinetic energy ; 3 (therefore) less, respiration / ATP made ; 4 less active transport or less, movement / loading, of sugars into sieve tube (element) ; 5 less, osmosis / movement of water, into sieve tube (element) ; 6 low (hydrostatic) pressure created ; as temperature increases: 7 (molecules have) more kinetic energy ; 8 (therefore) more, respiration / ATP made ; 9 more active transport or more, movement / loading, of sugars into sieve tube (element) ; 10 more , osmosis / movement of water, into sieve tube (element) ;		1 ACCEPT loading / uptake for transport  3 IGNORE no respiration / no ATP made / no loading of sucrose 4 ACCEPT slow active transport / slow loading  9 ACCEPT faster active transport / faster loading  12 DO NOT CREDIT cells

	11 higher / more (hydrostatic) pressure created; 12 at high temperature (plant), enzymes / proteins, denatured ;	3 max	denatured 12 CREDIT change to tertiary structure, damage to proteins
7	phospholipids; form bilayer; (bilayer) has hydrophobic core; prevents diffusion of, polar molecules / ions; <i>idea that</i> barrier separates different areas; (bilayer) allows diffusion of non- polar molecules; glycoproteins; membrane stability; cell recognition; cholesterol; regulates membrane fluidity;	6	