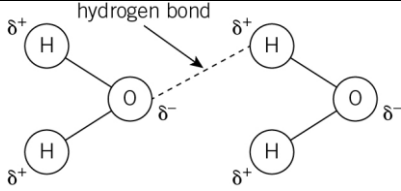


Question number	Answer	Marks	Guidance
1 (a)	two or more atoms; connected by (chemical) bonds;	2	
1 (b)	unequal distribution of electrons (across bond / between atoms); (leading to) relatively, positive / negative areas (of molecule);	2	
1 (c)	(water is) liquid; (water is a) polar solvent; e.g. blood and glucose; sap and sucrose;	4	Blood and sap are liquid which is required for movement; glucose and sucrose are polar molecules;
2	filter precipitate; dry; weigh; more precipitate means more glucose; plot calibration curve; use mass of precipitate from unknown solution concentration to estimate concentration;	5	Max 5
3	✓✓; ✓-; --;	3	
4 (a)	hydrophilic means attracted to water; phosphate heads are hydrophilic; hydrophobic means repels water; fatty acid tails are hydrophobic;	4	
4 (b)	dissolve sample in alcohol; mix solution with water; shake; cloudy solution is a positive result;	4	
5	non-protein; tightly bound to protein; required for function of protein; metal ion / iron ion, in haem;	4	
6 (a)	A phosphate group; B ribose / pentose / 5C sugar; C nitrogenous base; D phosphodiester bond;	4	
6 (b)	many monomers joined; monomers are nucleotides;	2	
6 (c)	RNA is single stranded / DNA is double stranded; RNA has uracil / DNA has thymine; RNA is shorter;	2	
6 (d) (i)	DNA is double strand held together by hydrogen bonds between bases; adenine binds to thymine; cytosine binds to guanine; all bases, form part of base pair / are bound to another base;	4	
6 (d) (ii)	incorrect base, inserted / deleted / substituted; (leads to) change in sequence of bases; mutation;	3	
7 (a)	as rate of cell division increases the rate or ribosome synthesis increases; linear relationship; figures quoted; <i>idea that</i> trend more closely followed at higher values;	4	
7 (b)	mRNA binds to ribosome; tRNA binds to ribosome; <i>idea that</i> tRNAs positioned to allow binding of amino acids; enzyme that catalyses formation of peptide bond is present in ribosome;	3	
7 (c)	as cell number doubles ribosome synthesis doubles; figures quoted; new cells are (genetically) identical; protein requirements the same for each new cell;	4	
8 (a)	A transcription; B translation;	2	
8 (b)	arrows show information exchange; protein does not code for anything; DNA cannot leave	3	

	nucleus; DNA needs mRNA intermediate to code for proteins;		
8 (c)	RNA virus; RNA copied into DNA by reverse transcriptase;	2	
9	<i>structure DNA nucleotide</i> deoxyribose sugar / four different bases <i>ATP</i> ribose sugar / one type of base <i>Both</i> three phosphates / one base; <i>function DNA nucleotide</i> part of genetic code; <i>ATP</i> energy transfer;	5	3 marks for structure and 2 marks for function
10	1 hydrogen bond represented as, horizontal / vertical, dashed line between O on one molecule and H on the adjacent molecule ; 2 hydrogen / H, bond label (on any drawn bond between 2 molecules) ; 3 (delta positive) $\delta^+$ on each drawn H and (delta negative) (2) $\delta^-$ on each drawn O ;	3	 <p>1 DO NOT CREDIT if &gt;1 H bond is drawn between the same two molecules 3 if both molecules drawn, <math>\delta^+</math> and <math>\delta^-</math> on all atoms. ACCEPT d (lower case) for <math>\delta</math></p>
11 (a)	<p>ice floats (ice less dense because) molecules spread out; molecules form, crystal structure / lattice / AW ; ice forms insulating layer / clearly described ; water (below ice), does not freeze / still liquid / remains water / kept at higher temperature ;</p> <p>organisms do not freeze ; animals / organisms, can still, swim / move ; allows, currents / nutrients, to circulate ;</p> <p>solubility ions / named ion, polar / charged ; ions / named ion, attracted to / bind to / interact with, water;</p> <p>(named) organisms / plants / animals, uptake / AW, minerals / named mineral / nutrients ; correct use of named, mineral / nutrient, in organism ;</p> <p>temperature stability many / stable, (hydrogen) bonds between molecules ;</p> <p>at lot of energy to, force apart molecules / break bonds ;</p>	<p>P1 P2 P3 P4</p> <p>S1 S2 S3</p> <p>P5 P6</p> <p>S4</p> <p>S5</p> <p>P7</p> <p>P8</p>	<p>If possible, leave them off. If not, yes, we should explain that they are marks related to property linked to survival.</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>high (specific) heat capacity ; temperature does not change much / small variation in temperature ;</p> <p>effect of temperature on , enzymes / metabolic rate ; gases remain soluble ;</p> <p>Award once in any section hydrogen bonds ;</p> <p>QWC - Award if you see a P mark and an S mark within the same section ;</p>	<p>P9 S6 S7 S8 H 7 max 1</p>	<p>P7 Many hydrogen bonds between molecules = 2 marks (gets P7 and H) P8 ACCEPT heat as alternative to energy P9 DO NOT CREDIT latent heat capacity S6 could refer to organisms or surrounding water ACCEPT stays cool in summer / stays warm in winter DO NOT CREDIT constant alone 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>Look for the S mark first, then award QWC if there is a P mark in the same section in the mark scheme</p>
11 (b)	<p>hydrolysis / hydrolytic ; hydrophilic ;</p>	2	<p>ACCEPT phonetic spelling throughout IGNORE head</p>