



BIOLOGY MIND

Edexcel

A-Level

BIOLOGY

Biological Molecules

Carbohydrates 1

Time allowed

52 minutes

MARK SCHEME



Score

/43

Percentage

%

Carbohydrates

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	B (are R and S) ;		(1)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	C (is P only) ;		(1)

Question Number	Answer	Additional Guidance	Mark
1(b)	<ol style="list-style-type: none"> 1. glycerol plus three fatty acids as reactants ; 2. ester bond labelled ; 3. water shown ; 	2 ACCEPT an ester bond drawn out correctly even if not labelled	(3)

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	condensation / polymerisation ;	ACCEPT polymerization	(1)

Question Number	Answer	Additional Guidance	Mark
1(c)(ii)	glycosidic / 1,4 glycosidic ;	ACCEPT glycoside ACCEPT missing commas and commas replaced with dashes NOT 1,6 glycosidic IGNORE link or bond	(1)

Question Number	Answer	Additional Guidance	Mark
1(c)(iii)	Amylose is {coiled / unbranched / eq } / amylose has only 1,4 (glycosidic) bonds / eq ;	ACCEPT glycogen is not coiled / branched / has 1,4 and 1,6 glycosidic bonds	(1)

Question Number	Answer	Additional Guidance	Mark
1(c)(iv)	<ol style="list-style-type: none"> 1. contain glucose / eq ; 2. idea that they are compact so large { numbers of glucose / amylose / glycogen } molecules can fit into a small volume ; 3. insoluble therefore { does not affect osmosis / eq } ; 4. large molecules therefore { remains in cells / too big to diffuse / eq } ; 	ACCEPT if each described separately but allow each Mp once only <ol style="list-style-type: none"> 1. ACCEPT can be hydrolysed / broken down to release glucose 2. ACCEPT large amounts of energy in a small volume 3. IGNORE insoluble so will not dissolve 	(2)



Carbohydrates

Question Number	Answer	Mark
2(a)(i)	A a hydrogen bond ;	(1)

Question Number	Answer	Mark
2(a)(ii)	D a peptide bond ;	(1)

Question Number	Answer	Mark
2(a)(iii)	D glucose ;	(1)

Question Number	Answer	Mark
2(a)(iv)	C glycerol ;	(1)

Question Number	Answer	Additional Guidance	Mark
2(b)	nitrogen ;	IGNORE N if it is the only response	(1)

Question Number	Answer	Additional Guidance	Mark
2(c)	<ol style="list-style-type: none">1. glycosidic bond correctly drawn ;2. molecule of water shown to be produced ;3. remaining groups around disaccharide drawn correctly ;	<ol style="list-style-type: none">1. IGNORE labelling of bond2. ACCEPT water named or formula3. DO NOT ACCEPT two separate glucose molecules NB: check carefully H on C5	(3)



Carbohydrates

Question Number	Answer	Additional Guidance	Mark
2 (d)	<p>1. idea that water can form {hydrogen bonds / eq} ;</p> <p>and any one from</p> <p>2. water is a solvent / {ions / polar molecules / eq } can {dissolve / be transported / eq } in water</p> <p>3. reference to cohesion/adhesion</p> <p>4. idea of hydrogen bonds holding water together as a liquid, so that it can move in mass flow systems</p> <p>5. suitable ref. to specific heat capacity</p> <p>6. idea of distribution of thermal energy around body</p> <p>7. reference to high latent heat of vaporisation ;</p>	<p>1. ACCEPT water is slightly charged, description of charges on O and /or H IGNORE polar/ dipole as stated in Q stem</p> <p>2. ACCEPT named polar molecule IGNORE non polar molecules dissolving</p> <p>3. ACCEPT specific example e.g. surface tension on a pond</p> <p>5. ACCEPT thermal buffer / needs a lot of energy to change the temperature / eq</p> <p>IGNORE pH buffer</p>	(2)



Carbohydrates

Question Number	Answer	Comments	Mark
3(a)	<p>(QWC– Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none">1. (a) <i>glucose</i> ;2. <i>glycosidic</i> {bonds / links} ;3. <i>amylose</i> and <i>amylopectin</i> ;4. <i>amylose</i> has 1- 4 (<i>glycosidic</i>) {bonds / links} <p>AND <i>amylopectin</i> has 1- 4 and 1- 6 (<i>glycosidic</i>) bonds / eq ;</p> <ol style="list-style-type: none">5. <i>amylose</i> is {spiralled / coiled} ;6. <i>amylopectin</i> is branched / eq ;7. compact <i>molecule</i> / eq ;	<p>QWC spelling of words in italics should be correct. Penalise just once – ALLOW max score of 5 if 6 mpts met but one lost due to spelling mistake.</p>	(5)



Carbohydrates

Question Number	Answer	Additional guidance	Mark
3(b)(i)	<ol style="list-style-type: none">1. speeds up the rate of reaction / eq ;2. without being { changed/used up / eq } ;3. lowers activation energy / provides an alternative reaction pathway / eq ;4. does not change { products / position of equilibrium / eq } / eq ;		(2)

Question Number	Answer	Additional guidance	Mark
3(b)(ii)	<ol style="list-style-type: none">1. breaks the (glycosidic) bonds / eq ;2. reference to use of water ;	<ol style="list-style-type: none">1. IG RE hydrogen bonds2. NOT makes water / eq	(2)

Question Number	Answer	Additional guidance	Mark
3(c)	idea that { maltose / disaccharide / glucose / monosaccharide } { is produced / tastes sweet } ;	ALLOW dextrans / sugar NOT any other named sugar eg sucrose	(1)



Carbohydrates

Question Number	Answer	Additional guidance	Mark
4(a)(i)	<ol style="list-style-type: none"> eukaryote cells have { membrane bound organelles / examples of membrane bound organelle } and prokaryotes do not ; DNA within a nucleus in Eukaryota but not in Bacteria / linear chromosomes in Eukaryota circular in Bacteria ; larger ribosomes in Eukaryota / 80S ribosomes in Eukaryota and 70S in Bacteria / eq ; Bacteria contain { plasmids / pili / peptidoglycan cell wall /eq } and Eukaryota do not ; 	<ol style="list-style-type: none"> e.g. nucleus CCEPT mesosomes 	(2)

Question Number	Answer	Mark
4(a)(ii)	ribosomes ;	(1)

Question Number	Answer	Mark
4(b)(i)	rough endoplasmic reticulum / rER / RER ;	(1)

Question Number	Answer	Mark
4(b)(ii)	A – Golgi apparatus ;	(1)



Carbohydrates

Question Number	Answer	Additional guidance	Mark
4(b)(iii)	<p>*QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence.</p> <ol style="list-style-type: none"> reference to involvement of <i>ribosomes</i> on the { rER / <i>rough endoplasmic reticulum</i> } ; <i>amino acids</i> { being joined by <i>peptide</i> bonds / forming <i>polypeptide</i> chains / forming <i>primary</i> structure of protein } ; <p>OR</p> <p>{ folded into 3-D shape / <i>secondary</i> or <i>tertiary</i> structure } in rER ;</p> <ol style="list-style-type: none"> packaged into <i>vesicles</i> at the end of the rER / <i>vesicles</i> { move to / transported to / fuse with / eq } the <i>Golgi apparatus</i> ; idea that { <i>protein/ enzyme</i> } <i>modified</i> in <i>Golgi apparatus</i> ; { <i>modified protein / enzyme / eq</i> } packaged into { <i>secretory</i> } <i>vesicles</i> { by <i>Golgi apparatus</i> } / eq ; <i>exocytosis</i> by <i>secretory vesicles</i> / <i>fusion</i> of <i>vesicles</i> with cell (surface) <i>membrane</i> / eq ; 	<p>*QWC - Emphasis is spelling</p> <p>ACCEPT X, Y, Z where appropriate.</p>	(4)

Question Number	Answer	Additional guidance	Mark
4(c)	<ol style="list-style-type: none"> different shape molecule requires different enzymes / reference to active site having to have different shape ; cellulose is made of β glucose and starch is made of α glucose / eq ; 1,6 glycosidic bonds only in starch ; starch made of amylose and amylopectin ; cellulose is linear / starch is { branched / helical / eq } / eq ; 		(4)

