Edexcel AS Biology B exam practice answers

1 Biological molecules

**1 (a)** (Peptide) bond shown between carboxyl group of LH acid and amino group of RH acid; elimination of water shown.

 ![Macintosh HD:Users:lucy.luke:Documents:Lucy's projects:Temporary folder:EPA artworks:FG_01_27[1].jpg]() [2]

 **(b)** Peptide. [1]

 **(c)** Ionic bonds help to hold tertiary structure in place; pH changes the ability of amino acids to form ionic bonds; NH2 becomes NH3+/COOH becomes COO– and H+. [3]

**2 (a)** Disaccharide. [1]

 **(b)** It reduces activation energy; by combining with substrate to produce enzyme–substrate complex. [2]

 **(c)** Enzymes are specific (in the substrates with which they combine); amylase can hydrolyse α-glycosidic bonds (in glycogen and starch); amylase cannot hydrolyse β-glycosidic bonds (in cellulose). [3]

**3 (a)** **A** = glycerol; **B** = phosphate; **C** = fatty acid. [3]

 **(b)** Head of phospholipid/phosphate group is hydrophilic; fatty acids are hydrophobic; so phospholipids form a bilayer (when water is present). [3]

**4 (a)** The enzyme concentration so that this remains constant throughout the investigation; pH/temperature because this affects enzyme activity. [2]

 **(b)** Plot a graph of concentration of product against time; draw a tangent to the curve at time 0; find the gradient of this tangent. [3]

 **(c)** A (sketch) graph shows the overall trend/the pattern more clearly. [1]

 **(d)** At any one time during **A**, many enzyme molecules are unused; since the substrate concentration is too low/there are too few substrate molecules. [2]

 **(e)** At any one time during **B**, all the enzyme molecules are in enzyme–substrate complexes; so none is free to bind with any substrates that might be added. [2]

**5 (a)** The original strands remain intact; each strand acts as a template for the production of a new strand. [2]

 **(b)** The sequence of nucleotides in the template strand; hydrogen bonds form between specific base pairs; base pairs are adenine with thymine and cytosine with guanine. [3]

 **(c)** The two strands are antiparallel; DNA polymerase catalyses the formation of phosphodiester bonds; can only add new nucleotides to carbon-3 of growing end of DNA. [3]

 **(d)** DNA ligase; (catalyses the formation of) phosphodiester bonds (between fragments). [2]

**6** This is an example of a free-response question. A good answer will contain any six of the following points (6 marks maximum):

* Water is the major component of most cells/organisms.
* Water is a reactant in many metabolic reactions/in hydrolysis reactions/in condensation reactions/in a correctly named reaction.
* Water is a universal solvent enabling metabolic reactions to occur faster in solution.
* The strong cohesion between water molecules enables a column of water to remain intact.
* The high specific heat capacity of water ensures that aquatic environments/the bodies of organisms remain relatively constant.
* The high latent heat of vaporisation ensures that the evaporation of water from the surface of organisms has a cooling effect.
* Its incompressibility enables water to support soft tissues/support gills/support plant tissues/act as a hydrostatic skeleton.
* The high surface tension of water enables organisms to live on water surfaces/enables organisms to live in air bubbles beneath water.
* The maximum density of water occurs at 4°C, so organisms can survive in water below surface ice. [6]