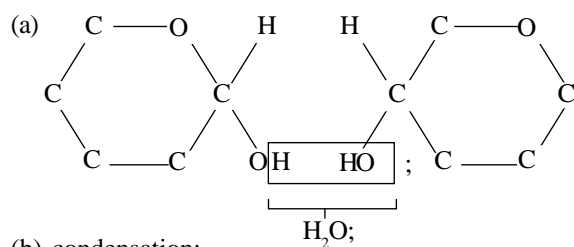


QUESTIONSHEET 1

(b) condensation;

2
1

(c) hydrolysis/digestion;

1

(d) liver/muscles;

1

(e) mix equal volumes of solution and dilute hydrochloric acid;
boil in a water bath (for 2 minutes) to hydrolyse sucrose (to glucose and fructose);
mix with equal volumes of Benedict's reagent;
boil in water bath (for 2 minutes);
if brick red precipitate appears then sucrose is present;
mix equal volumes of solution and (dilute/5 %) sodium hydroxide;
run dilute/1% copper sulphate solution into the solution;
a purple ring at the interface indicates protein is present;

Max 6

TOTAL 11

QUESTIONSHEET 2

(a) isomers;

1

(b) the position of -H and -OH groups on first carbon atom;

1

(c) leads to greater chemical variety/biochemical division of labour;
alpha glucose/starch is respiratory;
whereas beta glucose/cellulose is structural;

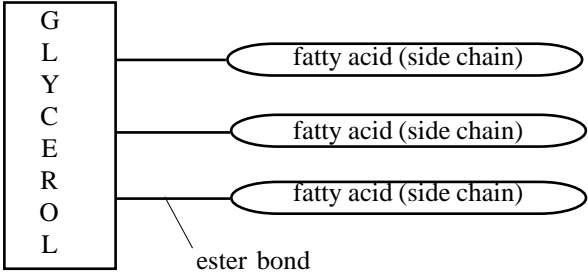
max 2

(d) glycosidic/condensation links;

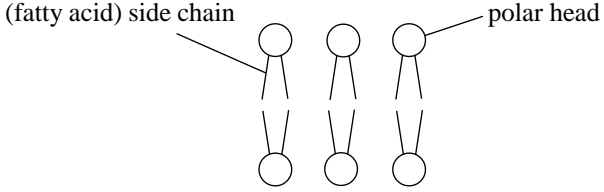
1

TOTAL 5

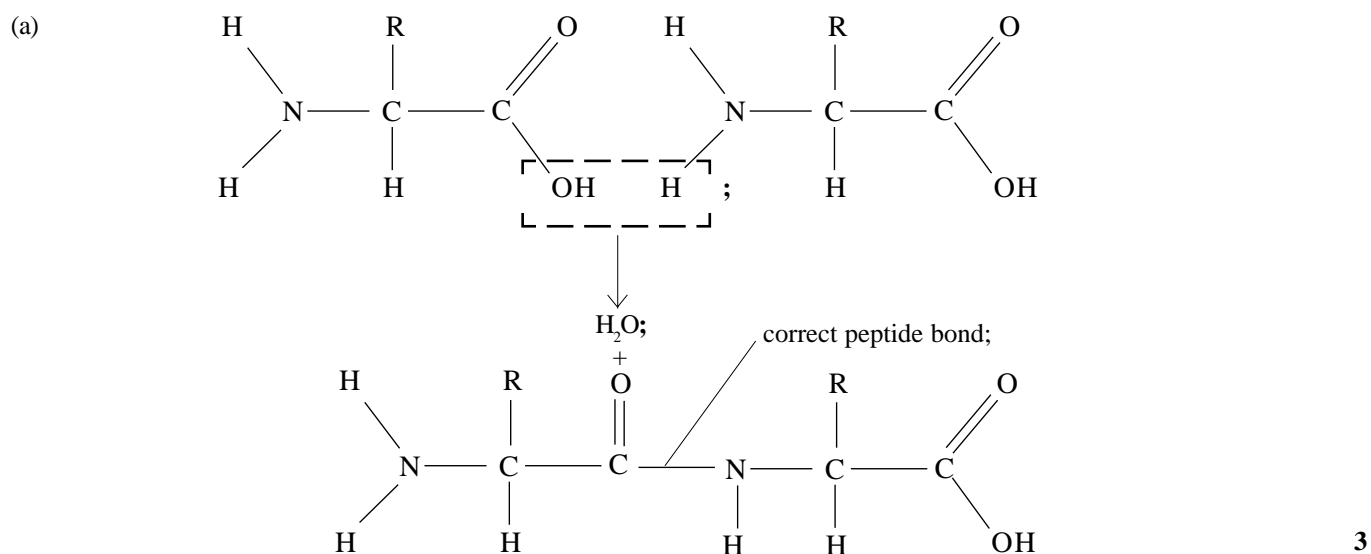
QUESTIONSHEET 3

- (a) (i) saturated means that the molecule contains the maximum number of hydrogen atoms;
unsaturated means that the molecule contains fewer hydrogen atoms than it might/contains double bonds; 2
- (ii) unsaturated fats have lower melting points than saturated fats;
unsaturated fats form oils but saturated fats are solid; 2
- (b) Any four of:
don't dissolve in water/body fluids/
therefore don't affect osmotic balance of cells/tissues/
have higher calorific value than carbohydrates/
can yield more energy per gramme on oxidation/
reference to other useful properties/buoyancy/insulation;;; 4
- (c) (i)  1 mark for labelling the glycerol part of the molecule;
1 mark for labelling the fatty acids;
1 mark for labelling the bond; 3
- (ii) one fatty acid molecule would be replaced by phosphoric acid/phosphate; 1

TOTAL 12**QUESTIONSHEET 4**

- (a) fatty acids joined to;
glycerol;
phosphate also attached;
reference to alcohol/choline attached to phosphate; (credit points on a diagram) **max 3**
- (b) (i)  Correct drawing;
Correct labels; 2
- (ii) polar heads mix with water, non polar tails do not;
thus heads face water on both sides with tails to middle; 2
- (c) Any 2 of:
waterproofing/protection qualified/cell membrane structure/insulation/give buoyancy;; 2
- (d) Either emulsion test - take sample and add equal volume of ethanol and an equal volume of cold water;
mix and if positive a white emulsion forms;
- or Sudan III test - add a few drops of Sudan III to sample;
red fat droplets appear if positive; 2

TOTAL 11

QUESTIONSHEET 5

- (b) (i) rest of the molecule/side chain; **1**
 (ii) hydrogen/methyl group/any correct group; **1**
 (iii) peptide; **1**
- (c) their molecules contain both acidic and basic groups; **1**

TOTAL 7**QUESTIONSHEET 6**

- (a) secondary protein structure/beta-pleated sheet; **1**
- (b) many hydrogen bonds between polypeptide chains; **1**
- (c) polypeptide chain;
 bends/folds extensively;
 into a compact/globular structure; **3**
- (d) Any two of:
 ionic/
 hydrogen/
 disulphide bridges;; (reject 'peptide' since these hold the primary structure together) **2**
- (e) haemoglobin/myoglobin/antibodies; **1**
- (f) add equal volume of (dilute/5%) potassium hydroxide solution to test solution;
 (down side of test tube) add a few drops of (1%) copper sulphate solution;
 presence of a purple ring at interface;
 which dissolves to form a purple solution on shaking, indicates protein; **max3**

TOTAL 11

QUESTIONSHEET 7

- (a) A - phosphate;
 B - pentose/ribose/deoxyribose; (not. sugar).
 C - nitrogenous base/pyrimidine/purine;
 D- nucleotide; 4

- (b) (i) bases that will join together;
 by hydrogen bonds;
 A to T and G to C; max 2

- (ii) RNA has uracil instead of thymine;
 RNA has ribose sugar instead of deoxyribose;
 RNA is single stranded instead of double stranded; 3

TOTAL 9**QUESTIONSHEET 8**

(a)

	monosaccharide	disaccharide	polysaccharide
ribose	✓	✗	✗ ;
glucose	✓	✗	✗ ;
maltose	✗	✓	✗ ;
starch	✗	✗	✓ ;
lactose	✗	✓	✗ ;
glycogen	✗	✗	✓ ;
cellulose	✗	✗	✓ ;

7

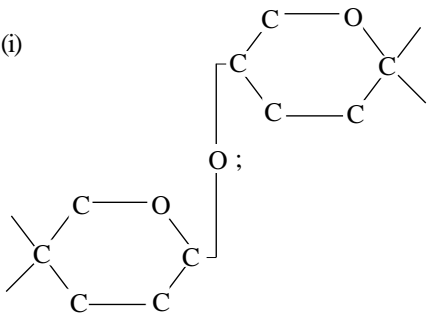
- (b) starch contains α -glucose, cellulose contains β -glucose;
 starch linked by α - glycosidic links, cellulose by β -glycosidic links;
 starch may contain branched chains, cellulose is unbranched; max 2

TOTAL 9

QUESTIONSHEET 9

- (a) (i) S = deoxyribose; P = phosphate; G = guanine; C = cytosine; T = thymine; A = adenine; 6
- (ii) G-C: hydrogen; 2
S-S: phosphate bridge/bond;
- (b) (i) supply energy;
for all energy-requiring reactions/synthesis/anabolism;
- (ii) co-enzyme;
hydrogen acceptor in respiration;
- (iii) responsible for transfer of acetyl units; from glycolysis to Krebs cycle; 6

TOTAL 14**QUESTIONSHEET 10**

- (a) disaccharide/maltose; 1
- (b) 1,4-glycosidic/alpha link; 1
- (c) condensation; 1
- (d) respiration/energy substrate; 1
- (e) (i)  1
- (ii) (1, 4 -)glycosidic beta link; 1

TOTAL 6**QUESTIONSHEET 11**

- (a) protein; 1
- (b) Any three of:
mix together equal volumes of solution and Benedicts reagent/
boil in a waterbath for (2 minutes)/
presence of brick red precipitate indicates glucose;;; 3
- (c) use same volumes of test and standard solutions;
add same volume of glucose oxidase solution to each;
incubate for a standard/stated time at a suitable/stated temperature;
add same volume of peroxide and indicator;
read intensity of colour in photometer;
calculate answer using formula $\frac{\text{Concentration of test}}{\text{Concentration of standard}} = \frac{\text{Reading of Test}}{\text{Reading of Standard}}$;

max 4**TOTAL 8**

QUESTIONSHEET 12

- (a) A - (beta)-glucose; 2
 B - (1,4) glycosidic beta link;
- (b) condensation/removal of water; 1
- (c) main component plant cell walls; 1

d)

	SUBSTANCE			
	Starch	Protein	DNA	
Only contains C, H, and O	✓	✗	✗	;
Contains nitrogen	✗	✓	✓	;
Positive when boiled with Benedicts reagent	✗	✗	✗	;
Hydrolysed to smaller units during digestion	✓	✓	✓	;
Contains uracil	✗	✗	✗	;

5

TOTAL 9**QUESTIONSHEET 13**

- (a) A & B; 1
- (b) (hydrophobic) tails;
 of phospholipid molecules; 2
- (c) (i) glycocalyx; 1
- (ii) polysaccharide/glycoprotein/carbohydrate; 1
- (ii) any two of: aids cell recognition/cell adherence/receptor sites for hormones/antibodies;; 2

TOTAL 7

QUESTIONSHEET 14

- (a) X - nucleic acid/DNA/RNA/ATP/nucleotide;
Y - protein/amino acid/polypeptide;
Z - cellulose/hemicellulose; 3
- (b) amylose; amylopectin; 2
amylose is an unbranched chain but amylopectin is branched; 1
- (c) (i) forms covalent/sulphur bonds;
holding adjacent polypeptides together/contributes to secondary/tertiary structure; 2
- (ii) increases protein's stability to pH change;
increases protein's stability to temperature change;
(allow 1 mark if just refer to 'strong bonding') 2

TOTAL 10**QUESTIONSHEET 15**

- (a) X - phospholipid;
Y - extrinsic/external/surface protein;
Z - intrinsic/integral/internal protein; 3
- (b) Y - cell recognition/support glycocalyx/has receptor groups;
Z - facilitated diffusion/active transport; 2

(c)

	Phospholipid	Protein	Carbohydrate	
Act as enzymes	X	✓	X	;
Allows passage of water soluble substances	X	✓	X	;
Involved in cell recognition	X	✓	✓	;

3

TOTAL 8

QUESTIONSHEET 16

(a) A: phosphate;
B: glycerol; 2

(b) circle round ; 1

(c) Precursors for prostaglandins/hormones/other fatty acids/essential for growth/provide energy/ATP synthesis; 1

(d) (i) vitamin A:
night blindness/hyperkeratosis/xerophthalmia;
failure to synthesise retinol/rhodopsin/drying/hardening/fracturing of epithelial tissues; 2

(ii) vitamin D:
rickets in children/osteomalacia in adults;
failure to regulate calcium/phosphate metabolism/absorption/mobilisation from bone/bent long bones/bow legs/
broken bones in adults; 2

TOTAL 8**QUESTIONSHEET 17**

a) (i) α helix/secondary structure/fibrous structure; 1

(ii) Any three of:
hydrogen bonds/ionic bonds/sulphur bonds/peptide bonds;;; max 3

(b) (i) tertiary structure/globular structure; 1

(ii) quaternary structure; 1

(c) consists of 4 polypeptide chains/2 α chains and 2 β chains;
tightly folded globular structure/compact;
to fit in red blood cells;
each chain contains a haem group which contains iron;
each haem group can reversibly bind with an oxygen molecule; max 4

TOTAL 10**QUESTIONSHEET 18**

(a) alpha-;
glycosidic; 2

(b) liver/muscles; 1

(c) many ends/exposed/terminal glucose units;
allows rapid release of glucose/rapid digestion of molecule/rapid mobilisation in respiration;
make molecule compact so much can be stored in a small space; max 2

(d) glucoses linked by beta-glycosidic links;
molecules are unbranched; 2

TOTAL 7

QUESTIONSHEET 19

(a)

Macromolecule	Composition
RNA/DNA/nucleotides;	
	amino acids;
	glycerol;
	alpha-glucose;
	beta-glucose;

5

- (b) sequence of amino acids;
governs distribution of bonding regions;
which influence the position of hydrogen bonds/ionic bonds/disulphide bridges;

max 2

TOTAL 7**QUESTIONSHEET 20**

deoxyribose/pentose; nitrogenous; hydrogen; cytosine; adenine; complementary; purine; thymine/cytosine; double helix; ten;

TOTAL 10**QUESTIONSHEET 21**

- (a) (i) on the single chromosome strand/in a plasmid; 1
- (ii) in the nucleus/on every chromosome; 1
- (iii) a nucleotide; 1
- (iv) A - adenine; T = thymine; C = cytosine; G = guanine; P = phosphate; D = deoxyribose; 6
- (b) C pairs with G thus these must add up to 54% ;
thus A and T must form remaining 46% ;
in equimolecular proportions thus thymine = 23%; 3

TOTAL 12