OCR

RECOGNISING ACHIEVEMENT

Subject: Biochemistry
Code: 2815/02

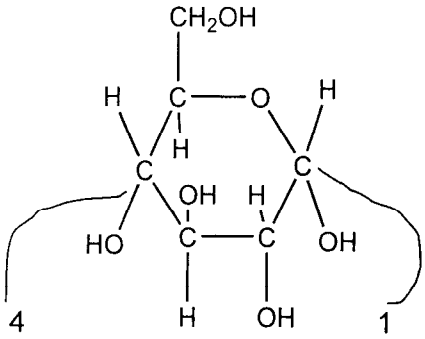
Session: January
Year: 2002

Final Mark Scheme

MAXIMUM MARK	45

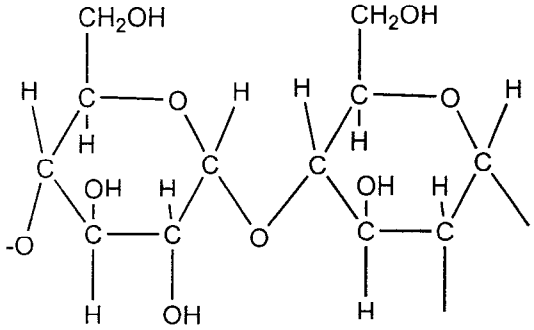
1 (a) α-D-glucose ✓ for α; ✓ for the rest. Accept glucopyranose 2

(b)



(c)(i) cellulose/starch/glycogen 1

(ii)



The ends can both be O-, or O-H (ie maltose) or as here
Glycosidic link ✓ below plane of rings for glycogen/starch ✓
above for cellulose

2

(iii) Use their answer to part (i), but must be a polymer

Starch: carbohydrate/energy storage ✓
reduced solubility ✓
enzymes required for release of glucose ✓
Glycogen: storage mark ✓
branching makes it more soluble than starch ✓
enzymes required for release of glucose ✓
Cellulose rigid/insoluble/linear molecules ✓ give good tensile strength/fibres ✓ Structural function/plant cell walls ✓
AW throughout

3

Question total **9**

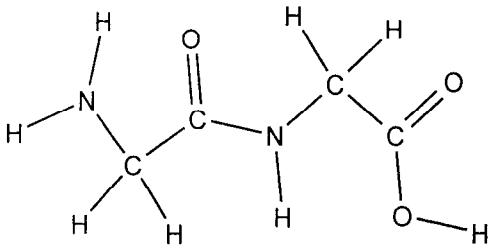
2. (a)

W hydrogen bonding ✓
X ionic (not electrostatic) ✓
Y van der Waals / hydrophobic ✓
Z covalent / disulphide bridge ✓ 4

(b) Y ✓ Accept van der Waals 1

(c) X because $-NH_3^+$ will lose H+ ✓ and become uncharged ✓ AW 2

(d)



✓ for the amide link and ✓ for the rest. Do not worry about angles
The terminal functional groups should both be charged/uncharged. 2

Question total 9

3 (a) It contains U rather than T AW ✓ 1

(b) - arg phe arg val- ✓ Each may start with a capital 1

(c) - GCCAAATCCCAT- for)✓✓. Only ✓ if single error. 2

(d) ecf - CGGTTTAGGGTA - ✓ 1

(e) both correct <u>only</u> ✓ 1

(f) Connection is formed by elimination of small molecule/water ✓
The polymer is a repeating structure ✓ of sugar-phosphate units/backbone ✓
A nucleotide is a molecule with sugar/deoxyribose and base attached ✓ AW

Clear definitions of two of the terms condensation, polymer, nucleotide will earn the QWC mark ✓ 5

Question total 11

4 (a) Region of molecule where substrate becomes attached ✓ 1

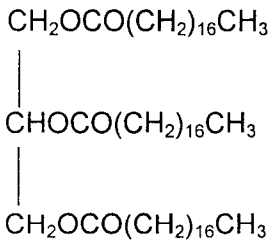
(b) At low [S] the rate is proportional to/depends on [S} / first order ✓
At high [S] all active sites are occupied ✓ ; no further increase in [S]
Increases rate ✓. AW 3

(c) (i) Competitive reversible competition for active site by molecule similar to substrate. ✓
Non-competitive· binding of inhibitor at another site ✓ 2

(ii) Look for a shallower curve ✓ which reaches the maximum rate later ✓ 2

Question total 8

5 (a)



✓ for an ester shown ✓ for rest 2

(b) Non-polar solvents and triglycerides both have van der Waals / hydrophobic attraction between their molecules✓ before and after mixing ✓ /there is no energy barrier to mixing ✓. Comments such as "like dissolves like" or "nonpolar solvents dissolve nonpolar solutes" earn max one ✓
It would be energetically unfavourable to break up the hydrogen bonding ✓
In water by introducing large/long non-polar molecules ✓ AW 4

(c) Any two ✓✓of energy store
Insulation
Protective layer on leaves / round organs
2

Question total 8

PAPER TOTAL 45