Unit 1 (6101)

Question 1

Maximum marks

Name of biological molecule	Smaller molecules from which it is made	Name of bond joining the smaller molecules
	Fatty acids and glycerol ;	Ester ;
Cellulose / polysaccharide / disaccharide ;		(1, 4) Glycosidic ;
		Peptide ;

Total 5 marks

Question 2 **Maximum mark**

Nuclear {membrane / envelope} / nucleolus ;

Centrioles ;

Metaphase ;

Centromeres / kinetochore / chromosome ;

Anaphase ;

5 marks

Question 3 **Maximum mark**

(a) (i) Hydrogen ;

Ionic ;

Disulphide ;

2 marks

(ii) It has two (polypeptide) chains / an A and a B chain / more than one (polypeptide) chain ;

1 mark

(b) (i) {Sequence / order} of amino acids ;

1 mark

(ii) 1. Reference to bonds between R groups ;

2. The R groups are always in the same position ;

3. {Bonds / named bonds} will always form in the same place ;

4. Reference to {hydrophilic groups on outside / hydrophobic groups on inside} ;

2 marks

Total 6 marks

Question 4 **Maximum mark**

(a) (i) A Flagellum ;

B DNA / bacterial chromosome ;

2 marks

(ii) Glycogen ;

1 mark

(iii) Made of {peptidoglycan / murein} / does not contain cellulose ;

1 mark

(b) Correct measurement: {80 / 81} mm ;

Correct division: ÷ 6000 ;

Correct conversion to μm ;

[Maximum 2 marks if answer is incorrect, correct answer: 13.3 / 13.5]

3 marks

Total 7 marks

Question 5 **Maximum mark**

(a) (i) (Inner) membrane of mitochondrion {is folded / forms cristae} ;

(Inner) membrane of mitochondrion has {ATPase / stalked particles / electron carriers} ;

Nuclear membrane has pores ;

(Outer) nuclear membrane is continuous with the endoplasmic reticulum ;

(Outer) nuclear membrane has ribosomes ;

2 marks

(ii) Chloroplast ;

1 mark

(b) 1. Cylindrical ;

2. Occur in pairs ;

3. Lie at 90° to each other ;

4. Made of microtubules ;

5. Arranged in {triplets / nine groups} ;

[Maximum 2 marks from marking points 1-5]

6. Reference to spindle formation / organisation ;

7. Reference to {microtubule organising centre / assembling the tubulin} ;

3 marks

Total 6 marks

Question 6 **Maximum mark**

(a) (Fluid because) phospholipids move (around membrane) ;

(Mosaic because) membrane contains {proteins / glycoproteins} (amongst phospholipids) ;

2 marks

(b) To remove the red pigment released by the cells {cut open / damaged} during preparation ;

1 mark

(c)
1. (Increasing bile salt concentration) results in increase of red coloration ;
2. No further increase in red coloration {between 1.6% and 2.0% / after 1.6%} ;
3. Reference to linear relationship between red coloration and bile salt concentration up to 0.6% ;
4. Reference to change in gradient after 0.6% ;
5. Manipulation of figures to compare gradients before and after 0.6 % ;

3 marks

(d)
1. Disruption of membrane by bile salts increases its permeability ;
2. Bile salts may emulsify lipids (within membrane) ;
3. Proteins (in membrane) may be affected ;
4. Pigment leaks through (plasma) membrane ;
5. Pigment leaks through vacuole membrane ;
6. By diffusion ;
7. More bile salts, {more cells break down / more membrane disrupted} ;
8. Reference to plateau as all cells have lost pigment / all membranes disrupted ;
9. Reference to plateau as there is no longer a diffusion gradient ;

4 marks

Question 6 continued **Maximum mark**

(e) Any ONE of the following regarding Beetroot 2:

was different age
was stored under warmer conditions
was stored in different conditions
had more cells damaged during preparation
had discs with skin still on them
had discs taken from a different region of the beetroot
was different species
contained different concentrations of pigment
was grown in different conditions

1 marks

Total 11 marks

Question 7 **Maximum mark**

(a) Ring drawn around one phosphate, one sugar and one base (linked together) ;

1 mark

(b)
1. Part of the DNA molecule unwinds ;
2. DNA strands {separate / unzips / H-bonds break} ;
3. (Mono)nucleotides line up against their complementary bases ;
4. Against {sense / one} strand ;
5. Reference to RNA polymerase ;
6. Individual mononucleotides join up by {condensation reactions / (phosphodi)ester bonds} ;
7. mRNA strands separate from DNA molecule ;
8. mRNA migrates into cytoplasm / eq ;

5 marks

(c) (i) Ribosomes / rough endoplasmic reticulum ;

1 mark

(ii) Ring drawn around U C G ;

1 mark

Total 8 marks

Question 8 **Maximum mark**

(a) Clarifying {wines / vinegar / fruit juices} / improves colour extraction from fruit skins / peeling fruit skins ;

1 mark

(b) (i) Same concentration of enzyme ;

Same pH ;

Same time for incubation ;

Same {type / age} apple ;

Same temperature for filtering ;

Standardisation of apple chopping ;

2 marks

(ii) The line goes up / rate increases ;

Because of increase in {kinetic energy / collisions} ;

Reference to optimum at 40 °C ;

2 marks

(iii) {Rate of production / line} decreases ;

Because bonds break ;

Therefore the active site changes shape / reference to denaturing of enzyme ;

Substrate will not fit / enzyme-substrate complex will not form ;

Enzyme is denatured at 60 °C ;

Reference to optimum at 40 °C ; [only allow once, either here or in (b)(ii)]

3 marks

Question 8 continued **Maximum mark**

(c) (i) Mixture D Line drawn between A and B ;

Line levels out at the same maximum as curves A, B and C ;

2 marks

(ii) 1. The results show that the rate of reaction depends on the relative concentrations of inhibitor and substrate / {B / C} have similar shape curve to A ;

2. Faster initial rate at lower concentration of inhibitor ;

3. {B / C} give the same yield {as A / when no inhibitor present} ;

4. This shows the inhibitor must be competitive ;

5. Will be binding to active site ;

6. Doesn't stop the reaction completely ;

2 marks

Total 12 marks