

AS UNIT BY1

Question **Answers/Explanatory Notes** **Marks Available**

1. (a)

Structure	Plant cell	Animal Cell
Centrioles	X	/
Mitochondria	/	/
Chloroplasts	/	X

(1 for each column)

[2]

(b) (i) Correct diagram showing double membrane with Inner membrane folded. [1]

Any 2 labels from matrix, crista, intermembrane space, double membrane, stalked particles, DNA, ribosomes. [2]

(ii) Aerobic respiration / ATP production (not: respiration) [1]

(iii) Muscle cell / liver cell/sperm/pancreas/epithelial cell from small intestine/neurone/companion cell. [1]

(iv) High requirement for energy for contraction/sperm movement / for chemical activity/high metabolic activity/active transport. (not: exercise) [1]

[Total 8 Marks]

2. (a) A – interphase (not: resting phase).

B – mitosis (not: cell division).

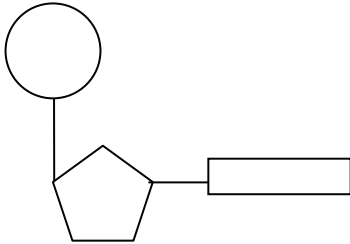
C – prophase. [3]

(b) (i) Metaphase - both chromosomes on equator, chromatids either side. [1]

Anaphase – 4 V or U shaped, centromere pointing towards centrioles. [1]

(ii) Nucleotide synthesis, replication of DNA, replication of organelles, protein synthesis, growth, synthesis ATP.AVP. (Any 2) [2]

[Total 7 marks]

Question	Answers/Explanatory Notes	Marks Available
3. (a)	(i)	
		
	Pentose shown as pentagon and labelled, sugar/ribose/deoxyribose	[1]
	Phosphate on C5 and labelled, phosphate/phosphoric acid	[1]
	Base on C1 and labelled, (nitrogenous) base/named base	[1]
	(ii) The pentose is ribose in RNA deoxyribose in DNA; (allow: clear description of extra oxygen e.g. sugar in DNA contains one less oxygen <u>atom</u> than sugar in RNA) the base thymine is only found in DNA / uracil in RNA. (not: ref. helix/strands/uracil and thymine) Comparison needed	[1]
(b)	(i) (Alternating) sugar / pentose or deoxyribose and phosphate.	[1]
	(ii) Adenine with thymine.	
	Cytosine with guanine. (not: abbreviations) Correct spelling thymine/cytosine.	[2]
	(iii) Hydrogen. (not: H)	[1]

[Total 9 marks]

Question	Answers/Explanatory Notes	Marks Available
4.	(a) (i) Fluid Mosaic.	[1]
	(ii) Head labelled hydrophilic AND tail labelled hydrophobic.	[1]
	(b) Secondary structure is folding of polypeptide chain / ref. to α helix or β pleated sheet; held by hydrogen bonds; tertiary is folding of α helix or secondary structure / correct reference to specific 3D shape; held by bonds between R groups / name at least 2 from covalent, disulphide, ionic, salt bridges, hydrophobic, hydrogen, van der Waals. (Any 4)	[4]
(c)	(i) Charged groups will associate with (hydrophilic) heads of lipids / layer; / hydrophobic inside hydrophilic outside. Uncharged groups will associate with (hydrophobic) tails.	[2]
	(ii) Will associate with heads only / attach to outside or inside of the membrane / correct use of extrinsic or would be surface protein. (not: would not be in the membrane unqual.)	[1]

[Total 9 marks]

Question	Answers/Explanatory Notes	Marks Available
5. (a)	<p>A. Cell / plasma membrane B. Cell wall</p> <p>C. Cytoplasm D. Tonoplast / vacuolar membrane</p> <p>E. Vacuole F. Plasmodesma(ta)</p> <p>(2 for all correct 1 if 1 mistake)</p>	
(b)	Diffusion; osmosis; active transport; facilitated diffusion. (Any 2) (not: apoplast/ symplast/ through F)	[2]
(c)	Cytoplasm / vacuole shrinks / gaps between wall and cytoplasm. (not: plasmolysis/cell shrinks)	[1]
(d) (i)	The difference between the free energy of water molecules in a system and the free energy of molecules in pure water / the tendency for water molecules to leave / move out of a system. (not: ref. to equation)	[1]
(d) (ii)	Zero.	[1]
(d) (iii)	P – 700 kPa. Q – 600 kPa.	[2]
(d) (iv)	From Q to P/ into P (not: out of Q). (independent mark from (iii))	[1]

[Total 10 marks]

Question	Answers/Explanatory Notes	Marks Available	
6.	(a)		
	(i)	Showing, 1 O and 2 H s removed. Elimination of water, stated. Molecules joined by oxygen bridge.	[3]
	(ii)	Maltose (not: disaccharide).	[1]
	(iii)	Water.	[1]
	(iv)	Condensation.	[1]
	(b)		
	(i)	Joining together sub units / monomers /repeating units/ residues (to make a larger molecule) (not: joining molecules into a chain/ specific example)	[1]
	(ii)	Correct axes – iron sulphate concentrate on horizontal, both labelled and units given. Suitable scale using at least half available space; plots visible and clear line correct shape. (not: extrapolation/line of best fit)	[3]
	(iii)	0.9mM (allow: between 0.7 and 0.9mM).	[1]
	(iv)	$60 - 5.2 = 54.8 / 60 \times 100 = 91.3(\%)$ (allow: 91) (2 for correct answer 1 for correct working but wrong answer.)	[2]
	(v)	Inhibitor competes with substrate (to bind with active site); inhibitor binds to/fits into active site; with inhibitor bound substrate is unable to bind/less E-S complexes; inhibitor same/complementary shape as substrate; the greater the concentration of substrate the less inhibition / ra / owtte (Any 3)	[3]
	(vi)	(Add iron sulphate to toothpaste / mouthwash / sugary drinks.) to prevent formation of plaque / tooth decay.	[1]

[Total 17 marks]

Question	Answers/Explanatory Notes	Marks Available
7. (a)	A. Enclosed by cell wall.	[1]
	B. Presence of cell/plasma membrane.	[1]
	photosynthetic membrane.	[1]
	D. DNA in tangled nucleoid / single chromosome / loop (not if looks like plasmid)	[1]
	E. Additional rings of DNA – plasmids / food reserve granules.	[1]
	F. Infoldings of cell membranes – mesosome.	[1]
	G. Ribosomes in cytoplasm.	[1]
	H. Ribosomes (very) much larger in eukaryote/70S.	[1]
	I. Prokaryote (1 -10 μm), eukaryote (10 – 100 μm).	[1]
	J. Cell wall of eukaryote made of cellulose/chitin and Prokaryote wall murein / peptidoglycan.	[1]
	K. Mitochondria in eukaryotes and mesosomes in prokaryotes	[1]
	L. Eukaryotes have nucleus / nuclear membrane / more genetic information.	[1]
	M. (Containing several paired) chromosomes / linear Chromosomes/DNA.	[1]
	N Eukaryote compartmentalised by membranes / contains organelles or 2 examples.	[1]
	O. Eukaryote chromosomes have protein / histones (half marks max. if pro and eu wrong way round or no diagram.)	[1]

Diagram 5 max, comparison 6 max. If wrong diagram (i.e. any eukaryote features) no marks but allow consequential error i.e. prokaryote and eukaryote comparison reversed.

[Total 10 marks]

Question	Answers/Explanatory Notes	Marks Available
(b)	A. Enzyme molecules that are fixed / bound / Trapped (not: immobilised/do not move)	[1]
	B. to an inert Matrix/alginate bead.	[1]
	C. They are more stable at higher temperatures (therefore reaction rates may be faster by using higher temps.)	[1]
	D. They can tolerate wider range of pH.	[1]
	E. They are more easily recovered for re-use/separated from product.	[1]
	F. Several enzymes with different pH or temp. optima may be used at one time.	[1]
	G. Reaction can be more easily controlled by adding or removing enzymes.	[1]
	H. They are specific so can select one type of molecule in a mixture.	[1]
	I. So can be used for rapid detection of biologically important molecules.	[1]
	J. They can also accurately measure the quantities present / are sensitive.	[1]
	K. Used in medical diagnosis / named condition eg diabetes.	[1]
	L. And environmental monitoring,	[1]
	M. Description of mechanism, some use a transducer to generate an electrical impulse that can be measured with a meter.	[1]
	N. eg. Blood sugar meter as used by diabetics / AVP.	[1]
	O. AVP/ easier to make pure product (not contaminated by enzyme.)	

[Total 10 marks]