

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	<p>Any two of the following points:</p> <p>(yeast cell)</p> <ul style="list-style-type: none"> • has a nucleus (1) • does not have a flagellum (1) • does not have a plasmid (1) <p>(bacterial cell)</p> <ul style="list-style-type: none"> • has chromosomal DNA / circular DNA (1) • has a capsule (1) • has a slime coat (1) • does not have mitochondria (1) 	<p>Accept: has a vacuole</p> <p>accept: named bacterial feature e.g pilli, small ribosome, if not labelled in yeast cell</p>	(2)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	does not have chloroplasts/chlorophyll	cannot photosynthesise	(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	7×10^9 (-) 5×10^{10} (1) $=$ (-) 4.3×10^{10} or (-) 43×10^9	<p>two marks for correct bald answer</p> <p>accept 43 000 000 000</p> <p>allow one mark for correct subtraction from wrongly selected numbers</p> <p>only accept the numbers in the table with a correct minus calculation</p>	(2)

Question Number	Answer	Acceptable answers	Mark
1 (b) (ii)	<p>A description including any two of the following points:</p> <ul style="list-style-type: none"> involved in defence against disease / part of immune system (1) phagocytosis (1) antibody / antitoxin production (1) 	<p>accept: (fight pathogen / harmful microorganism / named microorganism)</p> <p>accept: engulf / ingest / surround / digest cells</p> <p>reject: <u>make</u> antigens</p> <p>ignore: refs to role of red blood cells or platelets</p>	(2)

Question Number	Answer	Acceptable answers	Mark
1 (b) (iii)	tired / lack of energy / lethargy / short of breath	<p>anaemia / fainting / less oxygen / increased anaerobic respiration</p> <p>reject: references to asthma</p>	(1)

Question number	Answer	Mark
2(a)(i)	Any one variable from <ul style="list-style-type: none"> • temperature • amount of drying • type of potato • age of potato 	(1)

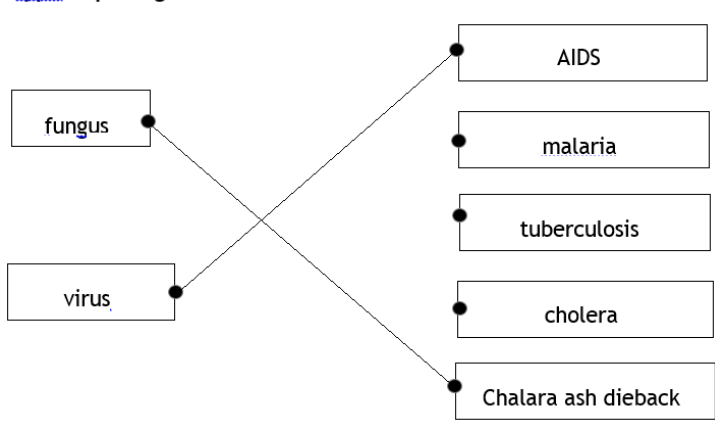
Question number	Answer	Mark
2(a)(ii)	To get an accurate reading of mass	(1)

Question number	Answer	Mark
2(a)(iii)	An explanation that combines identification via a judgement (1 mark) to reach a conclusion via justification/reasoning (1 mark): any one identification point from: <ul style="list-style-type: none"> • there is no change in mass at 0.3 mol dm^{-3} (check once drawn) (1) • this is the isotonic salt concentration in the potato (1) Plus reasoning/justification <ul style="list-style-type: none"> • because there is no net movement of water/no salt concentration gradient (1) 	(2)

Question number	Answer	Mark
2(a)(iv)	<ul style="list-style-type: none"> • repeat the test using intermediate concentrations (between 0.2 and 0.4 mol dm^{-3}) 	(1)

Question number	Answer	Mark
2(b)	B	(1)

Question number	Answer	Additional guidance	Mark
2(c)	<ul style="list-style-type: none"> • $68 \div 8000$ (1) • 0.0085 (1) • $8.5 \text{ (}\mu\text{m)}$ (1) 	award full marks for correct numerical answer without working	(3)

Question Number	Answer	Additional guidance	Mark
3(a)	<p><u>type of pathogen</u></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>fungus</p> <p>virus</p> </div> <div style="width: 45%;"> <p>disease</p> <p>AIDS</p> <p>malaria</p> <p>tuberculosis</p> <p>cholera</p> <p>Chalara ash dieback</p> </div> </div> 	reject more than one line from each pathogen	(2) AO 1 1

Question Number	Answer	Mark
3(b)	<p>C bacteria</p> <p>1. The only correct answer is C</p> <p><i>A is not correct because antibiotics do not kill antibodies</i></p> <p><i>B is not correct because antibiotics do not kill antigens</i></p> <p><i>D is not correct because antibiotics do not kill viruses</i></p>	(1)

Question Number	Answer	Additional guidance	Mark
3(c)	<ul style="list-style-type: none"> (patient Z) has a high(er) white blood cell count (1) white blood cells kill bacteria / pathogens/microorganisms/produce antibodies / produce antitoxins (1) 	<p>accept more wbc/most wbc</p> <p>accept fight infection / destroy bacterial infection</p>	(2)

Question Number	Answer	Mark
4(a) (i)	<p>B double helix</p> <p>1. The only correct answer is B</p> <p><i>A is not correct because the shape of a DNA molecule is not a single helix</i></p> <p><i>C is not correct because the shape of a DNA molecule is not a complementary helix</i></p> <p><i>D is not correct because the shape of a DNA molecule is not a triple helix</i></p>	<p>(1)</p> <p>AO 1 1</p>

Question Number	Answer	Mark
4(a) (ii)	<p>A sugars and phosphates</p> <p>1. The only correct answer is A</p> <p><i>B is not correct because amino acids and bases are not present in the DNA backbone</i></p> <p><i>C is not correct because bases are not present in the DNA backbone</i></p> <p><i>D is not correct because amino acids are not present in the DNA backbone</i></p>	<p>(1)</p> <p>AO 1 1</p>

Question Number	Answer	Mark
4(a) (iii)	(weak) hydrogen (bonds)	<p>(1)</p> <p>AO 1 1</p>

Question Number	Answer	Additional guidance	Mark
4(b)	<ul style="list-style-type: none"> homogenise cells(1) mix cells with a salt/detergent (solution)(1) 	<p>allow grind /crush/squash cells (using pestle and mortar)(1)</p> <p>accept use alcohol/ethanol(1)</p>	<p>(2)</p> <p>AO 1 2</p>

Question Number	Answer	Additional guidance	Mark
4(c)	<p>Any two from:</p> <ul style="list-style-type: none"> locate genes associated with diseases (1) treat (genetic) disorders (1) personalised medicine (1) 	<p>accept genetic screening(1)</p> <p>accept genetic counselling/named disorders(1)</p> <p>accept develop new treatment/medicine (1)</p>	<p>(2)</p> <p>AO 1 1</p>