Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1			C✓	1 (AO 1.1)	**Examiner's Comments** A small majority achieved this mark with all other distractors being seen.
			Total	**1**	
2		i	erythrocyte ✓	1 (AO 1.1)	**ALLOW** spelling that is phonetically loosely equivalent **Examiner's Comments** Most candidates got this correct and examiners were tolerant of a range of phonetically similar spellings. Some candidates wrote 'red blood cell', despite the question ruling this out as an answer.
		ii	1 single cell **and** two parts to nucleus **and** broadly circular ✓ 2 clear continuous (single) lines (on nuclear and cell surface membranes) **and** ≥ 45 mm horizontal diameter ✓ 3 ruled label lines (touching feature) ✓ 4 nucleus **and** cytoplasm / cytosol **and** cell (surface) / plasma , membrane labelled ✓ 5. colour of any of above mentioned (as annotation) ✓	4 max (AO 3.3)	**1 DO NOT CREDIT** if anything obviously incorrect has been drawn **2 IGNORE** minor errors if it is clear candidate has attempted to draw continuous lines **3 DO NOT CREDIT** arrows / label lines that cross **4 DO NOT CREDIT** nuclei **4 IGNORE** nuclear , membrane / envelope **4 IGNORE** lysosomes **4 DO NOT CREDIT** any other labelled structures **5 ALLOW** e.g., nucleus is darker **5 DO NOT CREDIT** if shading has been used **Examiner's Comments** This question differentiated well. Almost all candidates drew one cell that was roughly circular. A small number of candidates included only one of the two visible parts of the lobed nucleus. The cell drawings were, by and large, a reasonable size, and most candidates attempted to use continuous, single lines without any shading or hatching. Most label lines were ruled. Some candidates labelled the two parts of the lobed nucleus as

					'nuclei' or 'phagosome'. A number of candidates also attempted to draw and label structures that are not visible in the image, such as mitochondria, ribosomes and ER. **OCR support** Guidance on biological drawings is available in the drawing skills handbook at: Drawing skills handbook Biology Learner checklist: Graphs, Tables and drawings
		iii	**FIRST CHECK ON ANSWER LINE** **If answer = 8.0 (± 0.3) µm award 3 marks** 1 *correctly reading the diameter with the graticule and mapping this measurement onto the stage micrometer diameter* = 8.0 (± 0.3 divisions) / 0.008 (mm) ✓ 2 *converting units* 0.008 mm = 8.0 (µm) ✓ 3 *using correct number of significant figures*. answer in µm to 2 significant figures ✓	3 (AO 2.8)	*Where an answer is not obviously covered by the mark scheme, a single error should mean that only one of the marking points is not credited, e.g.,* '82' or '0.79' = 2 marks (mp 1 and mp 3). **AWARD** this mark for any answer where the first 2 significant figures are in the range 77 to 83 **AWARD** this mark if the final answer is between 5 and 10 (µm) **AWARD** this mark if the final answer given to 2 significant figures **Examiner's Comments** Only around half of candidates were able to use the scales to correctly measure the image and, of those, a small majority could successfully manipulate the units to micrometres. Having got that far, a minority of candidates then unnecessarily divided a perfectly serviceable answer by the objective lens magnification. Around 1 in 10 candidates achieved all 3 marks but the vast majority scored at least 1, usually for presenting an incorrect final answer to the correct number of significant figures.
			Total	**8**	
3		i	telophase ✓	1 (AO 2.7)	**Examiner's Comments** The image shows two clear darkened areas at each pole where the chromosomes have begun to cluster, which happens just before

					the nuclear envelope is reformed, and individual chromosomes are no longer clearly identifiable. These are clearly signs that the cell is in telophase, but 'anaphase' was a much more common candidate response. If the cell were in anaphase, it would show the sister chromatids being separated or the chromosomes migrating towards each pole. The chromosomes would be clearly distinguishable in a 'V' shape.
		ii	single area of dark (staining material) ✓ (individual) chromosomes not visible ✓ (nuclear material) not <u>as</u> dark ✓	2 max (AO 2.7)	**IGNORE** nuclear envelope visible **ALLOW** one / a / the , nucleus visible **IGNORE** present **ALLOW** chromatids not visible **IGNORE** thinner / in nucleus / not in two groups **<u>Examiner's Comments</u>** Many candidates missed the thrust of this question which was about how the image would look different. Around a quarter of responses achieved a mark, usually for noting that the chromosomes would no longer be visible. Simply stating that the chromosomes would not be condensed does not describe how they look. Some candidates stated that the chromosomes would be in the nucleus, but few went on to describe its appearance - that a single nucleus would be visible or that there would be a single central area of dark staining. It was rare to see a description of the nuclear material not being as dark.
		iii	many dividing <u>cells</u> / <u>cells</u> undergo frequent mitosis ✓	1 (AO 3.3)	**IGNORE** meristem tissue **<u>Examiner's Comments</u>** Most responses had the right idea that the correct answer was about high levels of mitotic activity but many of those candidates were let down by a lack of precision in their answers. Many wrote 'it' is undergoing frequent mitosis and in this context 'it' would be the tissue and not the cells. It was essential that candidates presented mitosis only as a process occurring in a cell.
			Total	**4**	
4			C✓	1 (AO 1.1)	**<u>Examiner's Comments</u>**

					Around a quarter of responses were correct. A large number of candidates identified the labelled structure in the micrograph as a lysosome. The presence of many lines within structure X are indicative of a mitochondrion.
			Total	**1**	
5	a		**1** magnification stated (in both figures) ✓ **2** all / only, (named) components in photomicrograph are drawn ✓ **3** no shading ✓ **4** correct proportions of, cells / nuclei ✓ **5** specifies type of cells / states <u>cheek</u> cells / specimen is named ✓	max 2	**IGNORE** ref to what is not drawn on **Fig 5.2** **2 ALLOW** only 2 cells are drawn **2 ALLOW** nucleus is drawn (as seen in photomicrograph) **5 IGNORE** has a title unqualified **<u>Examiner's Comments</u>** Well answered with most candidates referring to no shading and the magnification. Many candidates also appreciated the relative size of the drawing in relation to the photomicrograph. Some answers discussed the label lines and lack of arrow heads as a piece of evidence without appreciating the question refers to both figures to support the student's statement and not just a list of rules for a good biological drawing.
	b	i	*Compared to light microscope* **1** nuclear pore / nuclear envelope / vesicle / golgi apparatus, are visible ✓ **2** high(er) magnification / mag is x100 000 ✓ *Compared to scanning EM* **3** image is 2D ✓	max 2	**IGNORE** ref to image being black and white **IGNORE** ref to resolution **1 IGNORE** any other named organelle **3 ALLOW** image is not 3D as with a SEM **<u>Examiner's Comments</u>** Well answered with most candidates referring to the magnification and the visible organelles as compared to a light microscope. A large proportion of candidates also correctly compared the TEM to a scanning EM with statements about the two-dimensional nature of the figure.
		ii		max 4	**ALLOW** RER for rough endoplasmic reticulum throughout

			1 proteins are synthesised / translation occurs, on the ribosomes (of RER) ✓ **2** proteins then pass into, lumen / cisternae (of RER) ✓ **3** proteins can, fold / have carbohydrate added ✓ **4** (proteins) are packaged into, <u>transport</u> vesicles ✓ **5** (transport) vesicles move to Golgi by microtubules ✓ **6** vesicles fuse with <u>cis</u> face of Golgi ✓ **7** proteins are modified in Golgi and packaged into, (secretory) vesicles		**4 ALLOW** <u>transport</u> vesicles carry protein to the Golgi (from RER) **5 ALLOW** cytoskeleton for 'microtubules' **5 DO NOT ALLOW** vesicles moving to SER from RER (then Golgi) **7 ALLOW** proteins are processed for 'proteins are modified' **7 DO NOT ALLOW** proteins packaged as vesicles for 'packaged into vesicles' **<u>Examiner's Comments</u>** Most candidates achieved 1 or 2 marks, but few achieved full marks. Most candidates stated the role of ribosomes in protein synthesis, but few could follow through the exact chronology of the subsequent steps. Many answers focused on the movement of the secretory vesicle and exocytosis of the protein without appreciating the question culminated in the production of a secretory vesicle, not its fate. Some candidates confused translation with transcription. Details of translation were seen at the expense of space and time to discuss the role of the Golgi. Candidates should be mindful of the marking points and how they could be apportioned with respect to all the parts listed in a question.
		iii	requires, energy / ATP ✓	1	**DO NOT ALLOW** in context of diffusion
	c		**1** provides <u>mechanical strength</u> to the cell ✓ **2** holds organelles in place ✓ **3** aids transport of, (named) molecules / (named) organelles (within the cell) ✓ **4** cell movement ✓ **5** maintains cell, shape / structure / integrity / stability ✓	max 3	**ALLOW** microtubules / microfilaments for 'cytoskeleton' context **<u>Examiner's Comments</u>** Well answered with most candidates achieving 3 marks. Answers often discussed the cytoskeleton in terms of microfilaments and microtubules and were very articulate about the various roles in cells.

			6 (role in) cell division / cytokinesis / spindle fibres ✓		
			Total	**12**	
6			rough endoplasmic reticulum / RER ✓ Golgi (body / apparatus) ✓ (secretory / transport) vesicle(s) ✓	3	**ALLOW** lysosome **Examiner's Comments** There were many excellent responses for this question showing that candidates were clear about the roles of organelles in protein secretion.
			Total	**3**	
7			B	1	**Examiner's Comments** Candidates who were able to interpret a stained section of the liver and correctly identify structure **J** as (a branch of) the hepatic portal vein chose option **B** as the correct response. **Assessment for learning** Showing students images of photomicrographs from which they need to identify structures and describe what they see may help them to answer similar questions in the future.
			Total	**1**	
8			A = islet of Langerhans B = (branch of pancreatic) duct C = (named) blood vessel	3	**ALLOW** α-cell / β-cell **ALLOW** (intralobular) duct **ALLOW** artery / arteriole / vein / venule **ALLOW** red blood cell / erythrocyte **DO NOT ALLOW** capillary (contains too many erythrocytes) / incorrectly named blood vessel (e.g. hepatic artery) **Examiner's Comments** Most candidates correctly identified A as an

					islet of Langerhans. Credit was also given if A was identified as an α–cell or a β-cell. More successful answers recognised B as a (pancreatic) duct and C as a blood vessel, or a red blood cell inside the blood vessel. Marks were not gained due to references to the blood vessels being hepatic rather than pancreatic, or for thinking that C was a capillary which was not allowed as it contains too many erythrocytes.
			Total	**3**	
9		i	flagellum ✓	1	**ALLOW** flagella **ALLOW** phonetic spelling e.g flagela, flaegella **DO NOT ALLOW** undulipodia/ undulipodium (*as found in eukaryotic cells only*) **Examiner's Comments** The majority of candidates answered this correctly and were able to correctly spell the term flagellum. When there was an incorrect response, it often stated tail, cilia or undulipodium (which is found in eukaryotic cells only).
		ii	0.1 – 10 (μm) ✓	1	**ALLOW** any single value in the range *(from knowledge of prokaryote size not working from a magnification)* **Examiner's Comments** Most candidates gained this mark, however, a few candidates clearly did not understand the question and tried to calculate a size from the diagram (although no magnification was given) or on occasions stated the answer with the incorrect unit, e.g. nm.
			Total	**2**	
10		i	*Safety precaution* cut away from the body **or** *idea that* only one person at a time should work on the specimen **or** use sharp, scalpel / scissors / knife / (razor) blade ✓	2max	**mark as prose** *Explanation mark can only be awarded if linked to **relevant** idea of safety precaution* *examples 'be careful when using, a scalpel / sharp instruments, to avoid cutting yourself = 1 mark (no precaution but has explanation) 'wear goggles to prevent plant sap going into your eye' =2 marks (safety precaution and explanation)* **IGNORE** 'be careful when using a scalpel' /

			explanation to avoid cuts / AW ✓ **OR** *Safety precaution* wash specimen / wash hands / wear gloves ✓ *explanation* to avoid, infection (with plant pathogens) / allergic reaction / AW ✓		'take care when using sharp instruments' **ALLOW** 'take care when using a sharp, scalpel / scissors / knife / razor blade' **ALLOW** use forceps to hold plant tissue / use of, dissection board / glass tile / slate e.g. to avoid penetrating the skin' / 'to avoid stabbing, yourself / someone else' **ALLOW** wear eye protection **Examiner's Comments** Most candidates achieved at least one mark in this question. Many were able to achieve both marking points. This was most often achieved by describing the use of a sharp scalpel (or similar) linked to the risk of cutting themselves. Many described cutting the vascular tissue away from themselves. However, it was less common for those candidates who selected to wear gloves or eye protection to accurately describe an appropriate risk; many responses described the use of gloves or goggles as a measure to reduce cuts, rather than avoid plant material causing irritation or infection.
		ii	**FIRST CHECK THE ANSWER ON ANSWER LINE** **If answer = 0.17 award two marks** 15 (mm) / 90 **or** 0.166 ✓ (2 significant figures =) 0.17 (mm) ✓	2	**ALLOW** 1 mark if answer not given to 2 sig figs **ALLOW** any number of significant figures for mp1 (the working mark) **ALLOW ECF** from step 1 for an incorrect measurement divided by 90 **and** correctly rounded to 2 sig figs for **1 mark** e.g. 1.5(cm) / 90 = 0.0166 **and** = 0.017 for 1 mark **Examiner's Comments** This mathematical calculation posed little challenge to the majority of candidates. The most frequent source of error related to undertaking the initial measurement in centimetres and not correctly converting this unit to millimetres. Occasionally, candidates did not round the response appropriately. An

					incorrect measurement divided by 90 and correctly rounded to 2 sig figs was awarded 1 mark.
			Total	**4**	
11			A ✓	1	**Examiner's Comments** Some candidates were able to make the link between 'bacterium' in the stem of the questions and the fact that bacteria are prokaryotic cells. They knew that the cells do not have membrane bound organelles such as Golgi apparatus, so they were able to identify A as the correct response.
			Total	**1**	
12			D ✓	1	**Examiner's Comments** Many candidates were able to identify that although all other processes would be stopped eventually and ultimately the cells would die, the immediate effect of the Chloramphenicol is to stop the function of ribosomes. Therefore, they were able to identify D as the correct response as translation occurs at the ribosomes. This showed a good knowledge of the organelles involved with protein synthesis and the function of different organelles.
			Total	**1**	
13			D ✓	1	**Examiner's Comments** Most candidates correctly answered D and were able to make links between the features of the different stages of mitosis and the photomicrograph, and/or were familiar with images of the different stages of mitosis.
			Total	**1**	
14			B ✓	1	**Examiner's Comments** Many candidates were able to identify the correct cells in the image provided and selected B as the correct response. Examination of microscope images/micrographs and drawing skill activities linked to the different types of leucocytes can reinforce the key features of the different types.
			Total	**1**	

<table>
<tr>
<td>15</td>
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<tr><th>organelle</th><th>a membrane-bound organelle</th><th>found in both animal and plant cells</th><th>has a role in lipid production</th></tr>
<tr><td>rough endoplasmic reticulum</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>smooth endoplasmic reticulum</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>ribosome</td><td></td><td>✓</td><td></td></tr>
<tr><td>mitochondrion</td><td>✓</td><td>✓</td><td></td></tr>
</table>
</td>
<td>4</td>
<td>one mark per correct row

IGNORE crosses

<u>Examiner’s Comments</u>

This proved to be a good discriminator particularly at the lower end. Many candidates demonstrated a good understanding of cell ultrastructure achieving 3 or 4 marks. The most common error was thinking that ribosomes are membrane-bound organelles.</td>
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<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
<tr><td>16</td><td></td><td></td><td>C ✓</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>1</td><td></td></tr>
<tr><td>17</td><td></td><td></td><td>C ✓</td><td>1</td><td><u>Examiner’s Comments</u>

Most candidates selected the correct response, C. The most common incorrect response was A. Movement of cells through their environment is a function of the cytoskeleton but not for skin cells. Candidates are encouraged to identify the key words in the question and think carefully about their responses.</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>1</td><td></td></tr>
<tr><td>18</td><td></td><td></td><td>B ✓</td><td>1</td><td><u>Examiner’s Comments</u>

Many candidates selected the correct response, B. Answer C was a common error but candidates need to remember that plasmids do not have linear DNA as they do not have terminal ends. Answer D was also another common answer, may be because prokaryotes do have 70S ribosomes but they do not possess endoplasmic reticulum.</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>1</td><td></td></tr>
<tr><td>19</td><td></td><td>i</td><td>1 movement of cells ✓</td><td>max 3
(AO1.2)</td><td>Mark as continuous prose
IGNORE cilia / flagella
MP1 ALLOW change in cell shape e.g phagocytosis</td></tr>
</table>

			2 strengthening / supporting , cells ✓ 3 movement of (named) organelles ✓ 4 holds organelles in place ✓ 5 form (mitotic / meiotic) spindle ✓ 6 movement of , chromatids / chromosomes ✓ 7 cleavage in (some) cells / cytokinesis ✓		**MP2 ALLOW** maintains cell shape **IGNORE** structure **MP3 ALLOW** form tracks for motor proteins **MP4 ALLOW** attachment of (named) organelle(s) **MP7 IGNORE** cleavage / cytokinesis , in plant cells **Examiner's Comments** This question was generally well answered with most candidates gaining at least 1 mark. Some candidates gave two answers that were the same marking point. For example, vesicles are considered organelles, and therefore 2 marks would not be gained for stating movement of vesicles, and movement of organelles, as this is still MP3.
		ii	1 change in , structure / function , of (cytoskeleton) protein ✓ 2 less / no , movement of vesicles / exocytosis / release of neurotransmitter ✓ 3 less / no , synaptic transmission / AW ✓ 4 could change diameter of axon ✓ 5 affects speed of nerve impulses ✓ 6 *idea that* it could affect Schwann cell integrity / AW ✓	max 2 (AO2.1)	**MP1 ALLOW** non-functional protein is producde **MP2 DO NOT ALLOW** 'no vesicles released' **MP3 ALLOW** impulse cannot cross synapse / action potentials do not continue from one neurone to the next **MP3 DO NOT ALLOW** action potential cannot cross the synapse **Examiner's Comments** This question was challenging for some candidates. Good responses included suggestions that this could result in lack of movement of vesicles or affect the release of neurotransmitters and went on to suggest that this could result in loss of transmission at the synapse. Some candidates did not make the connection between mutation and change in protein structure or function and others described the effects resulting from a mutation to protein channels which, although relevant to protein structure, did not form part of the response about cytoskeleton proteins.
			Total	**5**	
20		i	*idea of* so bacterial cells are evenly distributed ✓	1(AO3.4)	**Examiner's Comments**

					About half of the responses achieved this mark. It was often stated the sample was needed to be mixed, or because bacteria will have settled to the bottom, but many responses omitted the explanation that an even distribution of bacteria was required. As in part (i), responses that discussed colonies or spreading bacteria on agar were not given marks.
		ii	small(er size)✓	1(AO3.4)	**ALLOW** size similar to wavelength of (visible) light **IGNORE** reference to resolution of microscope **Examiner's Comments** This synoptic question tested candidates' knowledge about relative cell size of eukaryotic (human) and prokaryotic (bacterial) cells in the context of using a light microscope to count them. Most responses gained this mark. A significant minority discussed microscope resolution without mentioning size and received no marks while others cited the absence of a nucleus to take up stain. A few candidates mistakenly thought that the bacterial cells would be moving due to flagella, or that they would be dividing rapidly, so would be difficult to count.
		iii	**1** *Calculate the number in 10 cm*^{3} multiply , 52 / number of bacteria in sample , by 1000 ✓ **2** *Correct treatment of serial dilutions* multiply by , 100^n (where n is the number of serial dilutions) ✓ **3** *Calculate the total in 50 cm*^{3} multiply (answer to **1**) by 5 ✓	3(AO2.8)	*Credit steps in any order* **1 ALLOW** if 52 000 seen as part of a calculation **1 ALLOW** 52 x 100 if working out number in 1cm^3 **3** 52 × 5 000 = 2 marks (**1** and **3**) *If mp1 has not been awarded* **ALLOW** 1 mark for 260 000 **ALLOW** answer written as single formula, e.g., • 52 × 1000 × 100^n × 5 = 3 marks • 52 000 × 100^n × 5 = 3 marks • 52 × 100 × 100^n × 50 = 3 marks (if working out no. in 1cm^3 first) • 100^n × 260 000 = 2 marks (steps not clearly described)

					Examiner's Comments Candidates found this unfamiliar style of question challenging. Although most gained at least 1 mark, it was rare to award all 3 marks. The most common mark given was for multiplying by a correct number to get the number of bacteria in 10 cm^3 or 1 cm^3. Some then went on to multiply this by the appropriate number, 5 or 50, to get the number in 50 cm^3. Very few candidates were able to clearly demonstrate how to deal with the number of serial dilutions, hence, the 2nd marking point was achieved only by the strongest candidates and this was normally written out rather than expressed as a formula. Some candidates did not attempt to describe the steps as the question asked but treated it as a calculation with a correct answer. This approach meant they could not access the 2nd marking point, as the number of serial dilutions was not stated in the question.
			Total	**5**	
21		i	digests / hydrolyses / destroys / kills / breaks down, pathogens ✓	1(AO1.1)	**IGNORE** 'get rid of pathogens' **IGNORE** ref to antigens **ALLOW** ref to parasites / damaged cells / tumour cells / old cells / old organelles for 'pathogens' **DO NOT ALLOW** 'engulf pathogens' **Examiner's Comments** Most candidates gained this mark. The most common reason for losing the mark was suggesting that the lysosome engulfed the pathogen, rather than the phagocyte engulfing it, or for suggesting that lysosomes are enzymes. Very few candidates gave acceptable alternatives to pathogens, such as damaged or old cells, rather giving vague answers such as breaking down molecules.
		ii	**FIRST CHECK ON ANSWER LINE** **If answer = 2×10^{-5} award 2 marks** $1.3 \times 10^{-21} / 6.5 \times 10^{-14} = 2 \times 10^{-8}$ (mol cm^{-3}) ✓ 2×10^{-8} (mol cm^{-3}) × 1000 = 2×10^{-5} (mol dm^{-3}) ✓	2(AO2.2)	**ALLOW** 0.00002 for 2 marks **ALLOW** '× 1000' seen anywhere in the answer **Examiner's Comments** Few candidates scored both marks for this question. Many candidates did not convert cm^3 into dm^3 or divided the numbers the

					wrong way round. Often incorrect answers were from not multiplying 2×10^{-8} by 1000 giving the final answer as 2×10^{-8}. Subsequently many candidates achieved ECF for 2biii and 2biv.
		iii	(−log 0.00002 =) 4.7 ✓	1(AO2.2)	**This mark is for a correct calculation**, therefore **ALLOW ECF** from part (ii) if the pH value calculated is given to 2 sig figs, even if outside the normal pH range, including correctly calculated negative values **Examiner's Comments** This mark was for a correct calculation, therefore ECF from Question 2 (b) (ii) was allowed, even if outside the normal pH range, including correctly calculated negative values. Many candidates did not have an awareness of physiological pH values or that a pH>14 or <0 was not plausible which may have helped them revisit 2bii. A small number of candidates recorded to 2 decimal places rather than 2 significant figures. **OCR support** Advice on using calculators to find logarithm functions for maths skill M0.5 can be found on page 16 of the Biology mathematical skills handbook on this page: https:/www.ocr.org.uk/qualifications/as-and-a-level/biology-a-h020-h420-from-2015/planning-and-teaching/ A tutorial, quiz sheet and teacher answers are available here under M0.5. https:/www.ocr.org.uk/subjects/science/maths-for-biology/arithmetic-and-numerical-computation/
		iv	B ✓	1(AO3.1)	**Apply ECF from part (iii)** **ALLOW** B if calculated pH is less than 7 **ALLOW** A if calculated pH is greater than 7 **ALLOW** C if calculated pH is 7. **ALLOW** B if no pH calculation given in (iii) **ALLOW** answer if shown on table if no answer given on answer line **Examiner's Comments**

					Again, an ECF was allowed from Question 2 (b) (iii). A common error by candidates was the selection of C for pH values just above or below a neutral pH, recorded between 6.7 and 7.7.
			Total	**5**	
22			**D**	1 (AO2.1)	
			Total	**1**	
23			**D** ✓	1	**Examiner's Comments** Only a minority of candidates gave the correct response (D). The most common incorrect responses were A and B. Candidates should appreciate that protein synthesis is one of the most fundamental requirements for life and therefore all organisms possess ribosomes.
			Total	**1**	