Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1	a	i	**Any two from**: Cell membrane ✓ Nucleus ✓ Ribosomes ✓ Cytoplasm ✓ Mitochondria ✓	2 (2 x AO 1.1)	**ALLOW** ER / golgi / nucleolus / storage granules / chromosomes **Examiner's Comments** Most candidates gave correct features, although there were a small number of incorrect references to cell walls.
		ii	Fungi have a cell wall/vacuoles, so not an animal but no chloroplasts, so not a plant ✓	1 (AO 3.2a)	**Examiner's Comments** This question proved to be the most challenging on the paper. A small number of higher performing candidates did realise that the absence of chloroplasts meant that fungi were not plants but in addition, the presence of a cell wall meant that they were not animals. Many responses concentrated on the presence or absence of mitochondria or ribosomes.
	b		**First check the answer on the answer line** **If answer = 11 400 award 4 marks** Measures the line as 3.2cm/32mm ✓ Converts 32mm to 32000 µm OR 2.8µm converted to 0.0028mm ✓	4 (3 x AO 2.2) (AO 1.2)	**ALLOW** answers in range 31 to 33mm **ECF** if line incorrectly measured

<table>
<tr>
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<td>32 000 ÷ 2.8 = 11 428.57
OR 32 ÷ 0.0028 = 11 428.57 ✓

= 11 400 (3 s.f.) ✓</td>
<td></td>
<td>ECF if line incorrectly measured or incorrect/no conversion

ALLOW 1 mark for clear evidence of incorrect answer correctly rounded to 3 significant figures

ALLOW full marks for correct answers calculations based on diameters in the range 31 to 33mm eg:

<table>
<tr><td>Diameter</td><td>31</td><td>31.5</td><td>32.5</td><td>33</td></tr>
<tr><td>Conversion</td><td>31000</td><td>31500</td><td>32500</td><td>33000</td></tr>
<tr><td>Calculation answer</td><td>11071</td><td>11250</td><td>11607</td><td>11785</td></tr>
<tr><td>Answer to 3 sig figs</td><td>11100</td><td>11300</td><td>11600</td><td>11800</td></tr>
</table>

<u>Examiner's Comments</u>

This calculation consisted of four main steps:

• the correct measurement of the yeast cell
• the conversion from millimetres or centimetres to micrometres
• the calculation of the magnification
• the adjustment of the answer to 3 significant figures.

Candidates may have made a mistake in one of these steps but were still given credit if the other steps were completed correctly. A range of sizes of the yeast cell from 31 mm to 33 mm was allowed.

The most common error seen in responses was an incorrect conversion of the measurement to micrometres.</td>
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<td></td>
<td>c</td>
<td></td>
<td>Carbon dioxide ✓</td>
<td>1
(AO 1.1)</td>
<td>ALLOW CO_2

<u>Examiner's Comments</u></td>
</tr>
</table>

					Most candidates correctly stated carbon dioxide but a small number gave ethanol as the answer.
			Total	**8**	
2			Hydrogen ions cannot build up in the space/cannot become concentrated, as the outer membrane is missing ✓ Therefore, they cannot diffuse back in(to the mitochondria) ✓	2 (2 xAO 3.2a)	**Examiner's Comments** Although this question covered a high-level concept, candidates were provided with plenty of information in the question. Many interpretated this information correctly and gave good responses.
			Total	**2**	
3			**Any three from:** In eukaryotes it is contained in the nucleus ✓ In prokaryotes it is in the cytoplasm ✓ In eukaryotes it/DNA/chromosome is a strand but in prokaryotes it is a loop/circle/ring ✓ Prokaryotes have plasmids / eukaryotes do not have plasmids ✓ In both it is made of the same component parts/base, sugar and phosphate/nucleotides ✓	3 (3 × AO1.1)	**Examiner's Comments** Most candidates appreciated that the DNA in eukaryotes is contained in the nucleus and in prokaryotes it is free in the cytoplasm. There were also correct references to plasmids in prokaryotes. The main confusion seemed to be concerning the structure of DNA. A number of candidates thought that it was a double helix in eukaryotes but not in prokaryotes.
			Total	**3**	
4			C ✓	1 (AO 2.1)	
			Total	**1**	