WJEC EDUQAS AS BIOLOGY · COMPONENT 1

BIOLOGY



EXAM QUESTION PACK

1.2 CELL STRUCTURE AND ORGANISATION

SCORE	PERCENTAGE
/72	%

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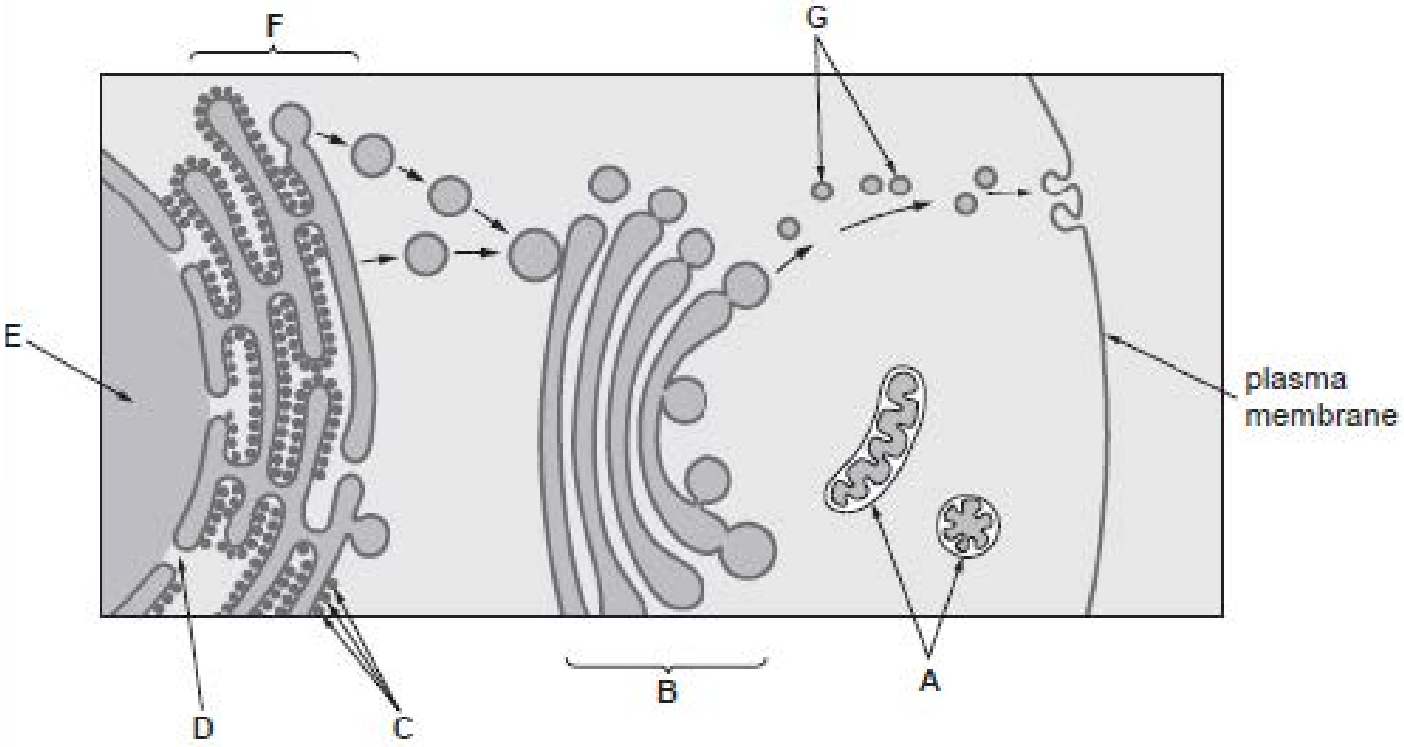
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1. The diagram below shows part of a cell taken from the pancreas, which is involved in the production of digestive enzymes.



(a) Identify the structures labelled A, B, C, D [2]

A: .....

B: .....

C: .....

D: .....

(b) (i) With reference to the structures labelled C, D and E, describe the sequence of events that lead to the production of digestive enzymes in this cell. [3]

……

……

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(ii) With reference to the structures B, F and G, describe the sequence of events that lead to the secretion of digestive enzymes from this cell. [3]

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(iii) Explain the role of organelle A in the production and secretion of digestive enzymes. [2]

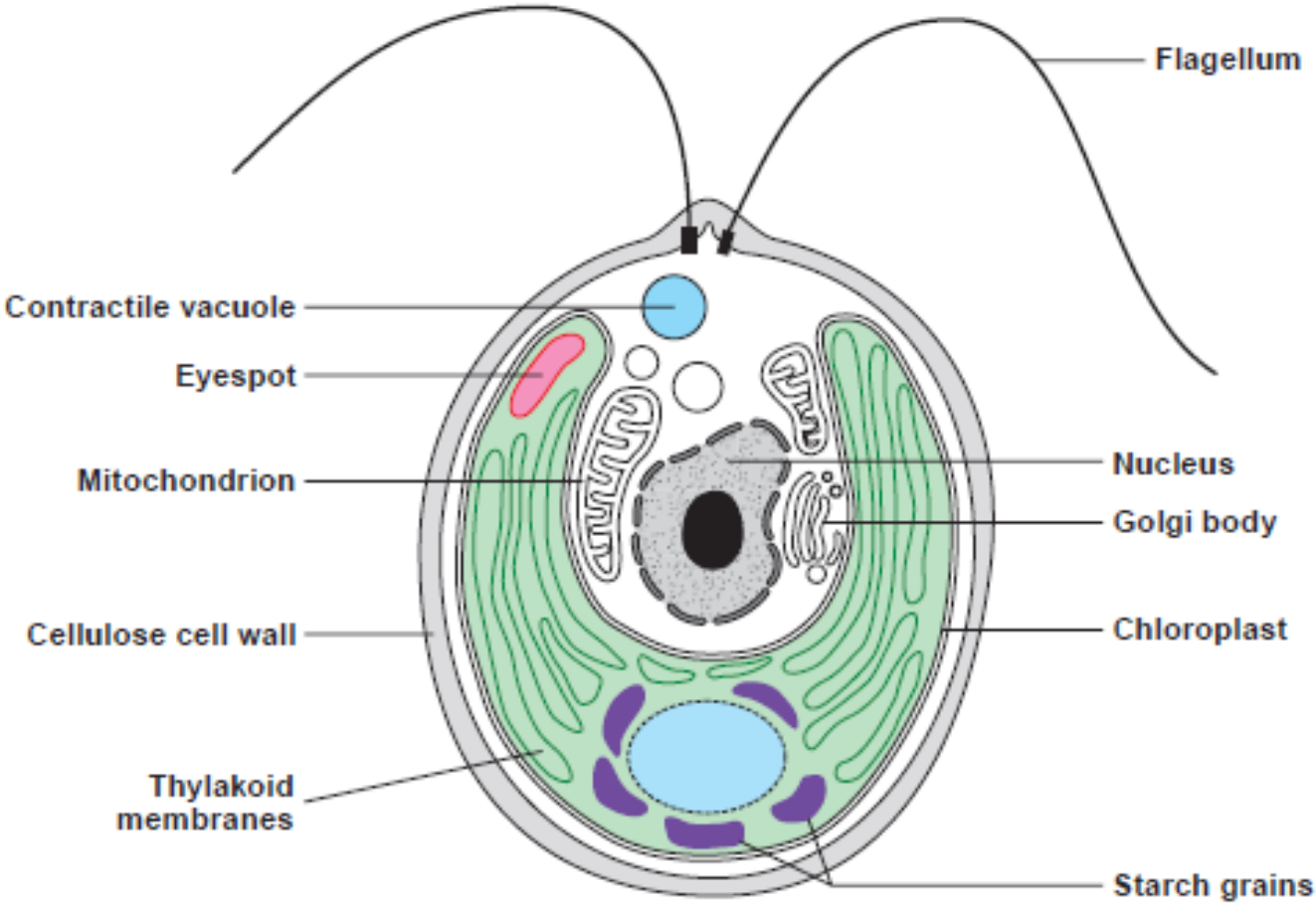
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2. The classification of protoctistan eukaryotes changes frequently. *Chlamydomonas reinhardtii* is now classified as a protoctistan but has previously been classified as an animal and a plant. The diagram below shows the structure of this organism.



(a) With reference to the diagram, explain why this organism has, at different times, been classified as an animal and a plant. [2]

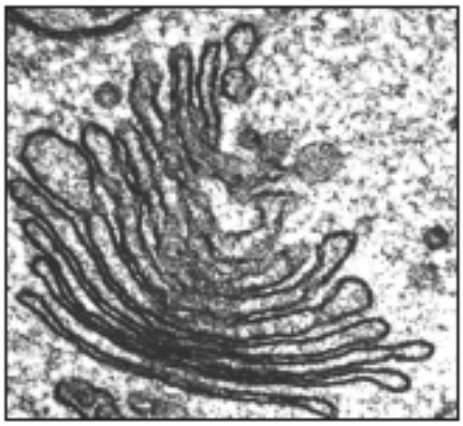
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3. Lysosomal storage disorders are a group of about 50 diseases that are characterised by an accumulation of waste products in the lysosomes. Two examples are Fabry disease and Tay-Sachs disease. Sufferers of Tay-Sachs disease die in childhood.



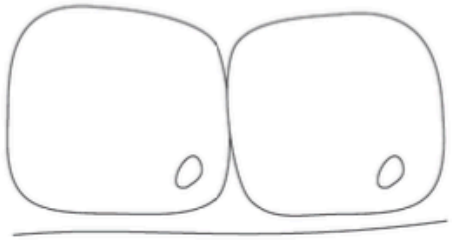
(a) The electron micrograph above shows the cell organelle responsible for producing lysosomes. Name the organelle, **draw an arrow labelled L** on the micrograph to identify a lysosome and describe a general function of lysosomes in normal cells. [3]

.....

.....

4. (a) Samples of epithelial tissue were examined using a light microscope. Drawings of cells from these tissues are shown below. Identify the type of epithelial tissue shown, and suggest from where in the body the samples were taken.

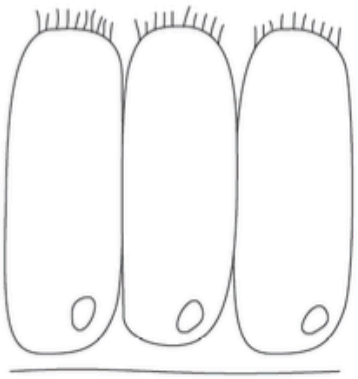
(i) [2]



Tissue type .....

Where found in body .....

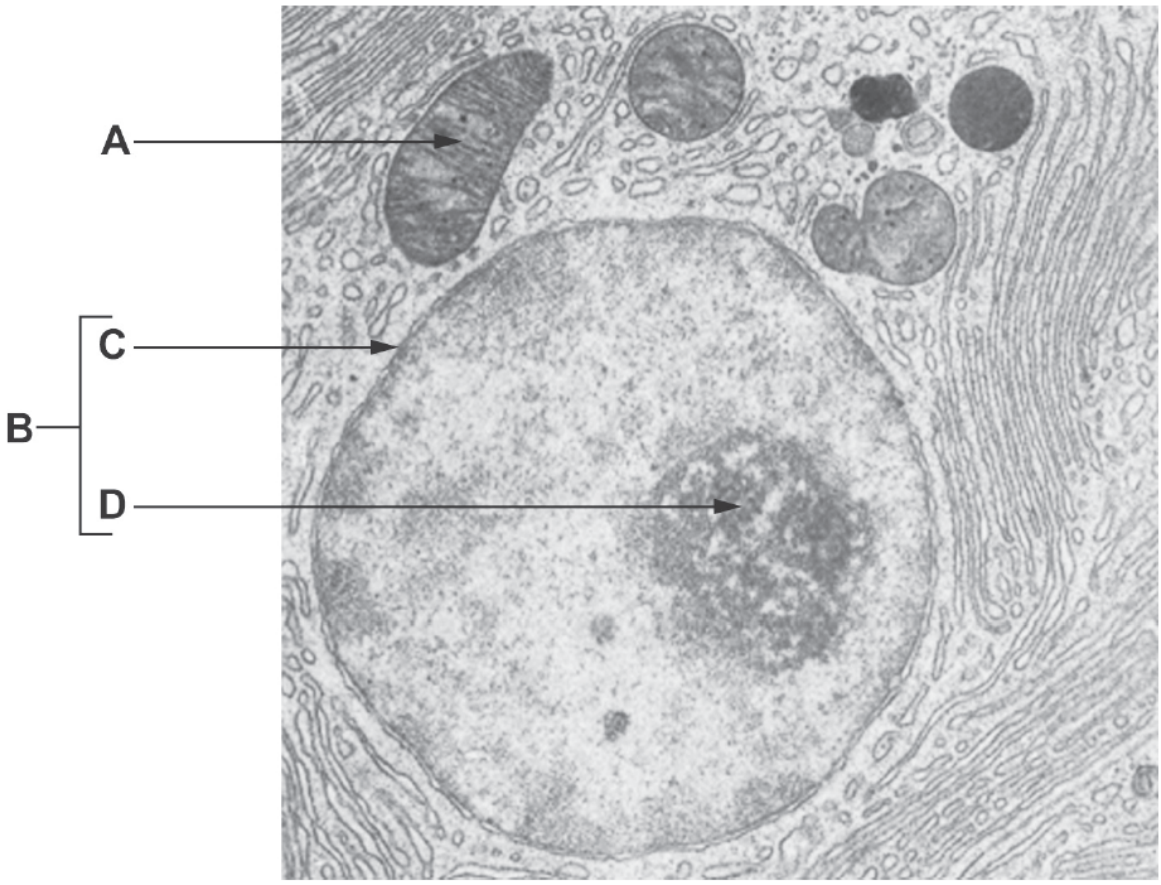
(ii) [2]



Tissue type .....

Where found in body .....

The electron micrograph below shows part of a typical animal cell.



(b) Complete the table below by naming the structures and organelles shown in the electron micrograph above, and describing their functions.

[4]

Letter	Organelle / Structure	Function
B	nucleus	
C	nuclear pores	
D		

(c) The nucleus has pores in the envelope that surrounds it, whereas organelle **A** does not. Describe **one** other difference between the membranes that surround organelle **A** and those that surround the nucleus.

[1]

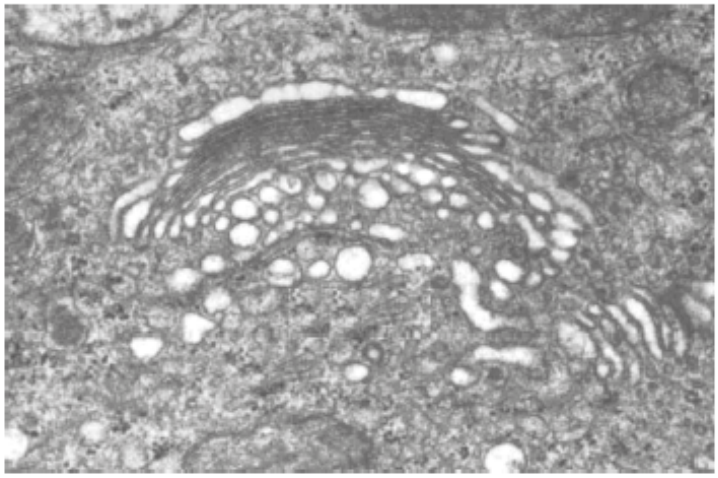
(d) Describe **two** differences between the ribosomes found in animal cells and those found in prokaryotic cells.

[2]

5. (a) The electron micrographs below show organelles in eukaryote cells.



A



B

(i) Identify the organelles in photographs **A** and **B** and state their function.

[2]

A

.....

Function

.....

.....

B

.....

Function

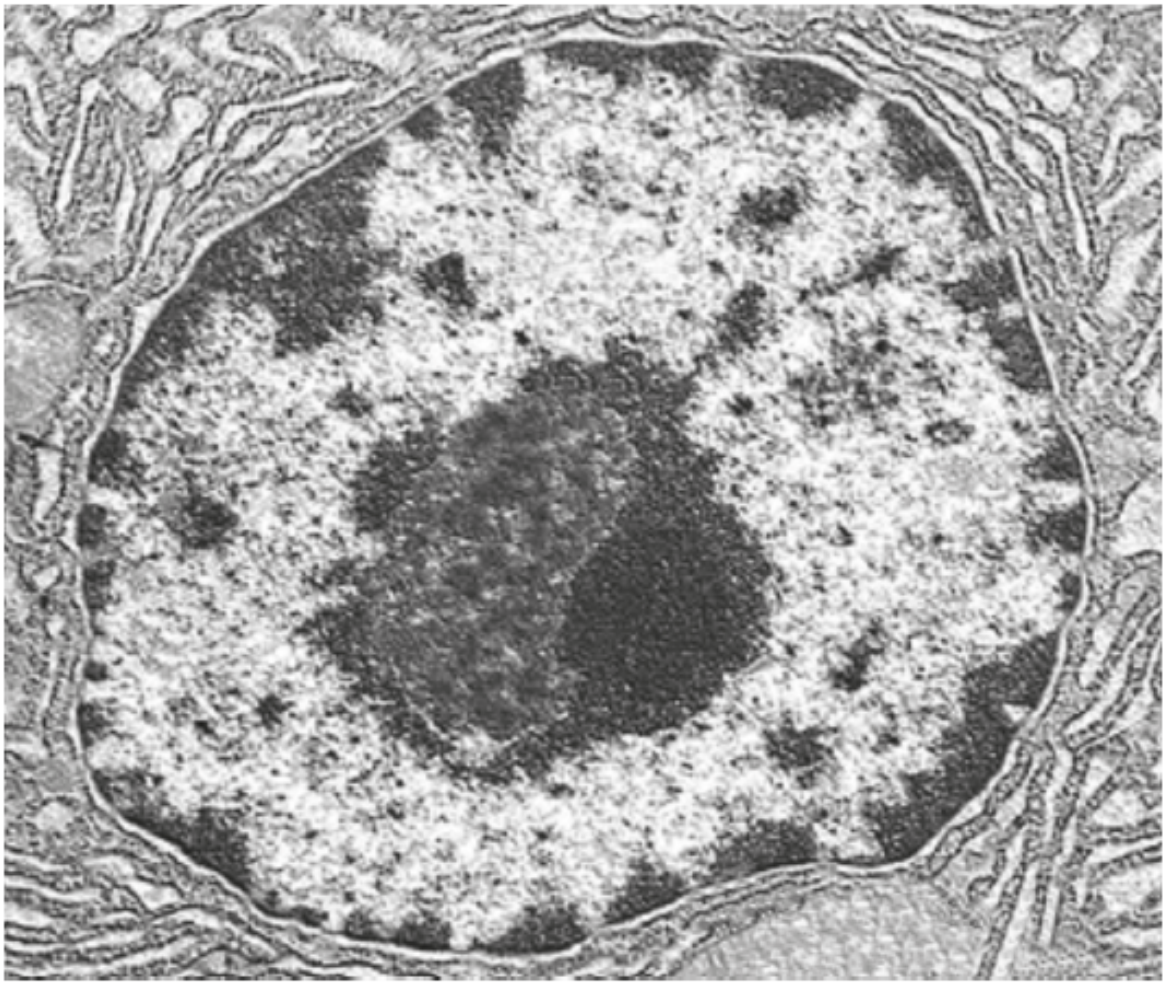
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(iii) Name a tissue which contains large numbers of the organelle shown in **A**.

[1]

.....



C

(b) Photograph **C** above shows a nucleus. State **two** features of a nucleus that can be seen in this electron micrograph and their function.

[2]

Feature 1

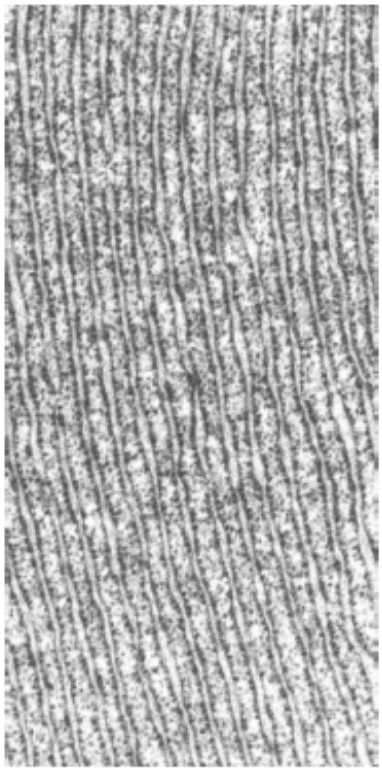
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Function

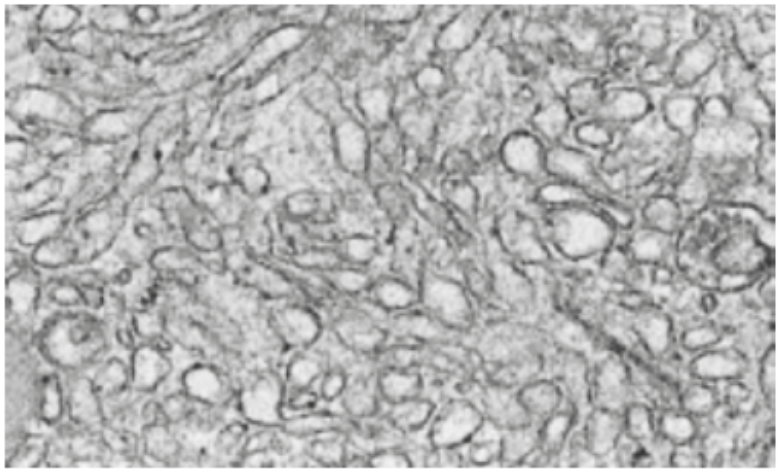
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Feature 2

Function



D



E

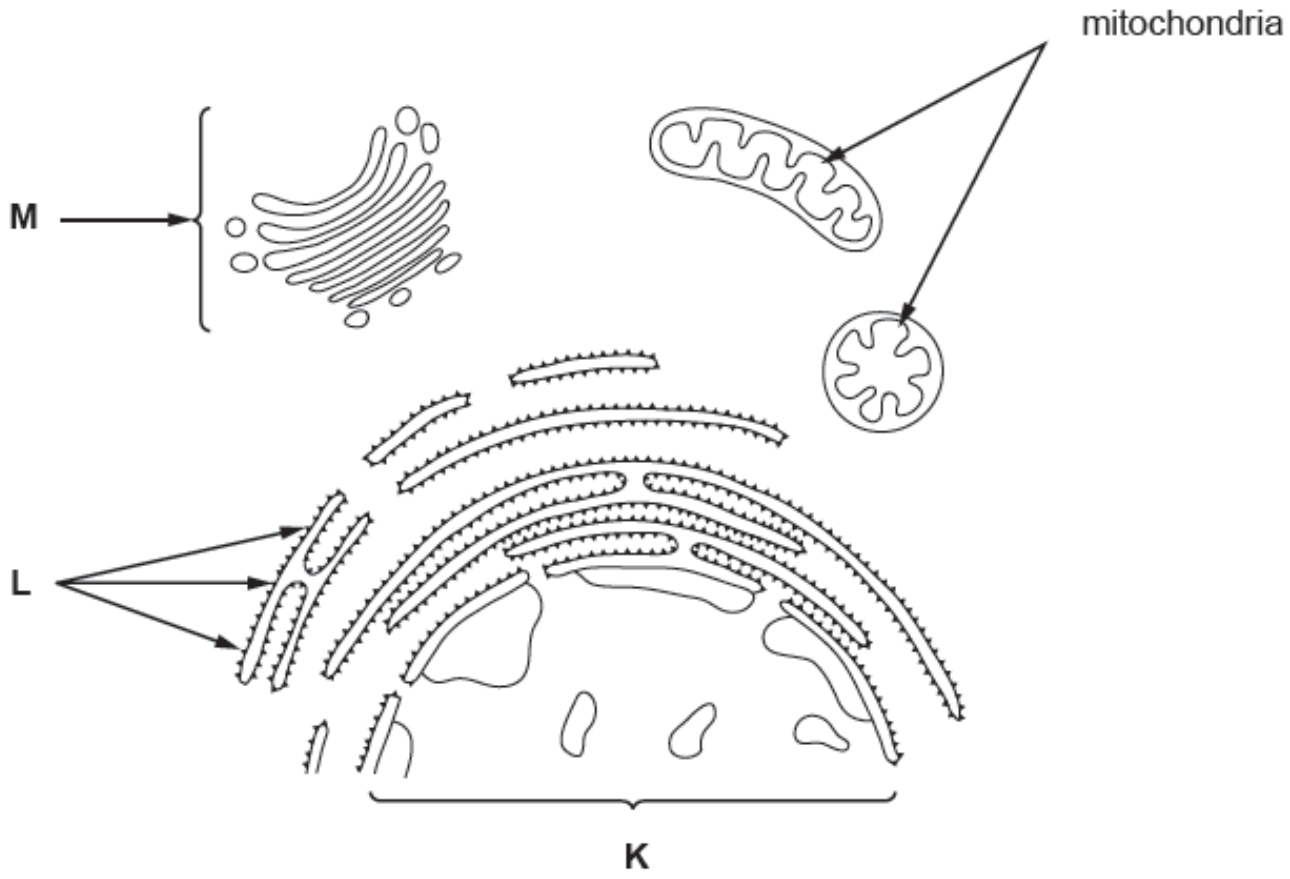
(c) Photographs **D** and **E** above show two different types of endoplasmic reticulum. State **two** visible differences between **D** and **E**.

[2]

Total

[7]

6. The diagram below shows part of a generalised animal cell.



(a) Complete the table below.

[6]

Organelle	Name	Function
K		
L		
M		

(b) (i) Explain why the mitochondria labelled in the diagram above appear different from one another.

[1]

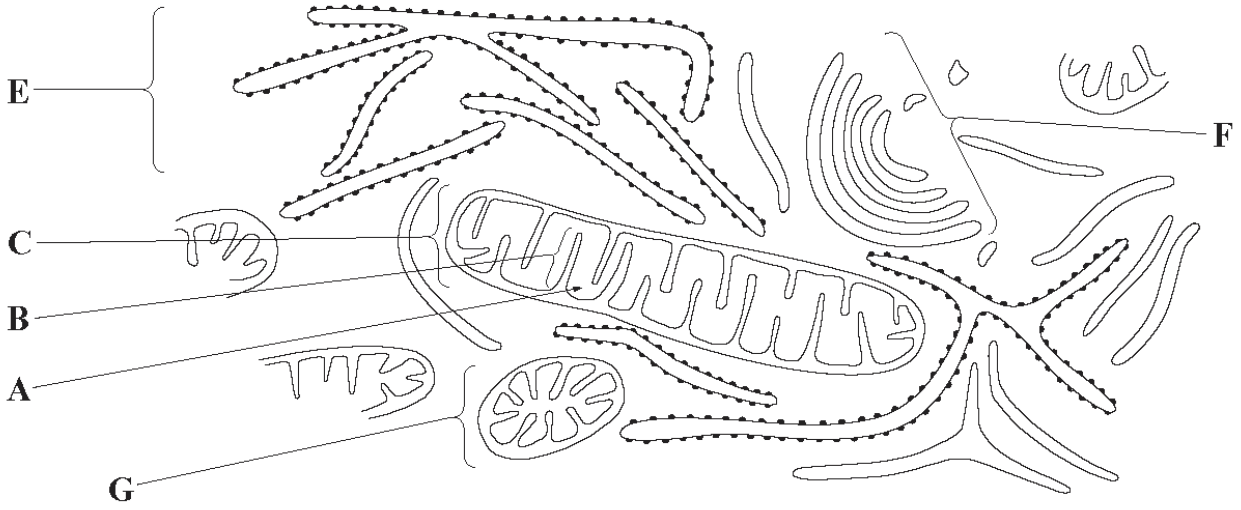
(ii) Nearly all eukaryotic cells possess mitochondria. Mitochondria are similar in size to prokaryotic cells and have features in common with them. This led to the biologist, Lynn Margulis, proposing that mitochondria evolved from ancient prokaryotes. The theory of endosymbiosis proposes that these ancient prokaryotes were engulfed by other bacterial cells and both benefited from the relationship - this led to the evolution of eukaryotic cells.

Using your knowledge, state which **two** structures found in prokaryotic cells are also found in mitochondria.

[2]

(iii) Describe **two** differences between mitochondria and prokaryotic cells such as bacteria.

7. The diagram below shows part of a cell that secretes a hormone into the bloodstream.



(a) Name structures **A** and **B**. [2]

A .....

B .....

(b) Explain the functions of structures **E** and **F**. [4]

E .....

.....

F .....

.....

(c) Suggest why this type of cell is likely to contain large numbers of structure **C**. [2]

.....

.....

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(d) Labels **C** and **G** show the same type of organelle. Explain why they differ in appearance. [1]

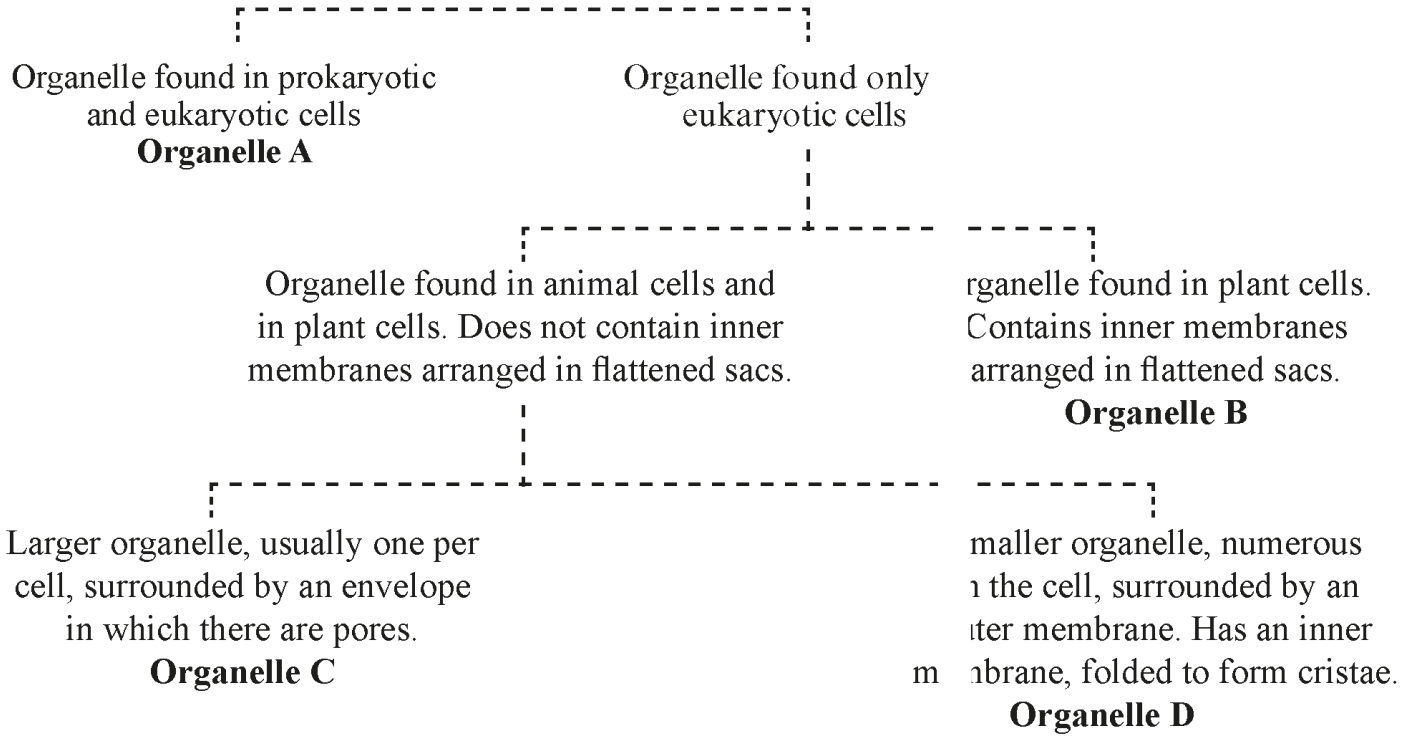
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(Total 9 Marks)

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8. The diagram shows how some organelles may be distinguished from each other.



(a) (i) Name organelle **D**. [1]

.....

(ii) Describe the function of organelle **D.** [2]

.....

.....

.....

(iii) Name a cell that contains **large** numbers of organelle **D.** [1]

.....

(b) Which of the organelles **A, B**, **C** or **D** is a ribosome? [1]

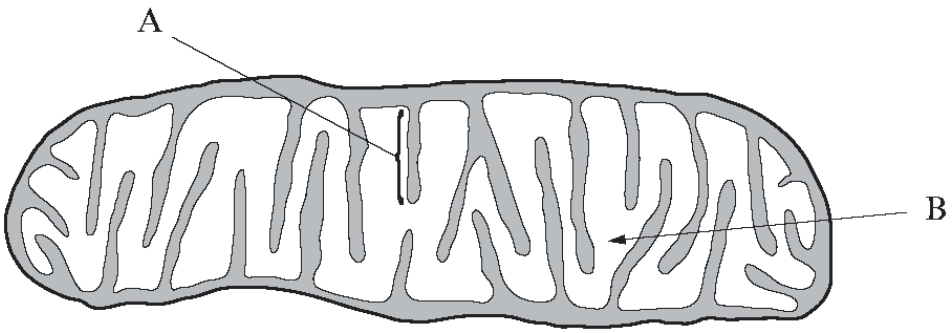
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(c) What is the function of the pores in organelle **C**? [1]

.....

.....

9. The diagram below shows an organelle found in a liver cell.



(a) (i) Name the organelle. [1]

.....

(ii) State the function of the organelle. [1]

.....

(iii) Name the structures labelled A and B in the diagram. [2]

A .....

B .....

(b) Explain why liver cells have large numbers of these organelles present. [2]

.....

.....

.....

(Total 6 marks)

1.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)			A: Mitochondrion/mitochondria B: Golgi {body/complex/apparatus} C: Ribosome(s) D: Nuclear pore 2 or 3 correct for 1 mark All correct for 2 marks	2			2		
	(b)	(i)		Nucleus/ E: (contains DNA which) codes for the production of {proteins/polypeptides/sequence of amino acids in a polypeptide}/ transcription/ {pre-processing/ production/ synthesis} of mRNA (1) Nuclear pores/ D: allow {mRNA/rRNA} to leave the nucleus (1) Ribosome(s)/C: carry out translation/ protein synthesis/or description of (1)	3			3		
	(b)	(ii)		**Any 3 × (1) from:** Rough Endoplasmic Reticulum/ RER/ F: transports proteins {through the cell/ through the cytoplasm}/ transports proteins to golgi body/ package proteins into vesicles (1) Golgi body/ B: {Packaging/Modification} of protein/description of/ activation of enzyme (1) (transport) vesicle/ G: transports {proteins/enzymes} to the {cell membrane/ plasma membrane} (1) Exocytosis (of enzymes from the cell) (1)	3			3		
		(iii)		Provide ATP : {for transcription / translation / protein synthesis} (1) exocytosis (1)		2		2		
				Question 1 total	**8**	**2**	**0**	**10**	**0**	**0**

2.

Question				Marking details	S	Marks Available					
						AO1	AO2	AO3	Total	Maths	Prac
2	(a)			chloroplast/cellulose cell wall/starch grains = plant (1) flagellum/ small vacuoles/eyespot = animal (1) Not mitochondria (golgi body neutral)			2		2		
				Question 2 total	**0**	**0**	**2**	**0**	**2**	**0**	**0**

3.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)			Correctly labelled lysosome (1) Golgi (apparatus/body) (1) Contain {hydrolytic/digestive} enzymes/{Break down/recycle} {organelles/macromolecules/debris}(1) Accept {transport/release} of enzymes within cell Reject disposal of waste unqualified/secrete enzymes	3			3		
				Question 3 total	**3**	**0**	**0**	**3**	**0**	0

4.

Question			Marking details	Marks Available
4	(a)	(i)	Cuboidal; Kidney tubule; Accept kidney/ liver/named gland/ureter/ovary/glands	2
		(ii)	Ciliated;NOT cilia Trachea / oviduct/fallopian tube/ bronchi/bronchioles;	2
	(b)		<table><tr><td>B</td><td>nucleus</td><td>contains <u>DNA</u> which {codes for/ controls} <u>protein synthesis</u>/ transcription/ <u>DNA</u> {synthesis/replication};</td></tr><tr><td>C</td><td>nuclear pores</td><td>{Transport/movement} of {mRNA/ nucleot des/rRNA}; Accept ribosomes NOT transport of mRNA in</td></tr><tr><td>D</td><td>Nucleolus;</td><td>Produces {rRNA/ribosomes/tRNA}; NOT produces RNA unqualified</td></tr></table>	4
	(c)		<table><tr><td>Organelle A</td><td>Nucleus</td></tr><tr><td><u>Inner</u> membrane is folded / Has cristae</td><td>No folding of <u>inner</u> membrane / no cristae;</td></tr><tr><td>No ribosomes attached</td><td>ribosomes attached;</td></tr></table> *must be comparative*	1
	(d)		Ribosomes are not attached to {membranes/ ER} in prokaryotes (some) are in animal cells; Ribosomes are {larger/80S} in animal cells than prokaryotes / 70S; *must be comparative*	2
			Question 4 Total	**[11]**

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5.

Question			Marking details	Marks Available
5.	(a)	(i)	A Mitochondrion/ mitochondria **Plus** ATP synthesis/aerobic respiration; NOT produce/ create energy	2
			B Golgi Body/ complex/ apparatus NOT golgi alone **Plus one of** • Modification of {proteins/lipids}/ Addition of sugar chains/ produces glycoprotein • {Transport/storage} of {lipids/digestive enzymes} • Synthesis of {(secretory) vesicles/lysosomes}/ packaging proteins; NOT transport(ation) of proteins/ synthesis of proteins	
		(ii)	Liver/muscle/nervous tissue/ meristem;	1
	(b)		Nuclear pores + Allows {mRNA/ribosomal RNA/ribosomes} to pass out/through of nucleus; NOT substances	2
			Nucleolus + Synthesis of ribosome (components);	
			(Double) nuclear membrane/nuclear envelope + Separates the DNA from the rest of the cellular contents/ holds DNA/ chromosomes;	
			Chromatin+ condenses to form chromosomes/ {involved in/ code for} protein synthesis; **Matched pair = 1 mark**	
	(c)		D presence of ribosomes + no ribosomes on E; D {membranes/ cisternae} in parallel/regular lines/ more organised + {open network of membranes/ cisternae}/ less organised/ or description in E;	2
			Question 5 Total	**[7]**

6.

Question		Marking details	Marks Available

6 *(a)*

Organelle	Name	Function
K	nucleus;	contains DNA which {codes for / controls} protein synthesis;
L	ribosomes ;	synthesise proteins;
M	Golgi apparatus/body;	packaging of proteins (for secretion from the cell) / (chemically) modifies proteins / produces glycoproteins / produces lysosomes;

6

(b) (i) They have been cut in different plane/ angle; — 1

(ii) (Loop of) DNA; — Max 2
(70S) ribosomes;
Both possess plasma membranes; NOT double membrane

(iii) Mitochondria: (statements should be comparative) — Max 2
Has a double membrane;
No cell wall;
No capsule;
No flagellum/ pili;
No mesosome;
No plasmids;

Question 6 Total — **[11]**

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7.

(a)	A = matrix;	
	B = crista/internal membrane;	**2**
(b)	E is the site of protein synthesis;	
	Polypeptide chains build up at ribosome;	
	transports polypeptides/proteins;	
	ribosomes read genetic code (allow: receive mRNA);	**2 max**
	F buds off vesicles/package proteins into vesicles;	
	these contain molecules for secretion;	
	transport protein molecules to cell surface/membrane;	
	synthesis of glycoproteins/modification of proteins;	**2 max**
(c)	secretory cell involved in active processes/metabolically active;	
	ATP/energy dependent;	
	ATP manufactured by C;	
	hormone synthesis requires ATP;	**2 max**
(d)	cut in different plane/AW;	**1**
		(Total 9 marks)

8. (a) (i) Mitochondrion/ mitochondria 1

(ii) Respiration/ aerobic respiration 1

stores {energy/ ATP}/ release energy/ {synthesis/produce ATP}/ release energy / ATP for respiration =2 marks NOT production of energy 1

(iii) muscle / liver/ epithelial cells of small intestine / cells of proximal convoluted tubule/ neurones/ companion cells/ sperm/ secretary cells NOT muscle tissue/ the liver/ cardiac tissue 1

(b) A 1

(c) allows transport of { messenger/ mRNA}/ nucleotides/ ribosomes NOT out and in 1

(Total 6 marks)

9. (a) (i) mitochondrion; **[1]**

(ii) aerobic respiration / production / manufacture of ATP; **[1]**
(not: make ATP for respiration)

(ii) A = cristae;
B = matrix; **[2]**

(b) metabolically active/ many chemical reactions or specified eg active transport
large amount of ATP produced/required; **[2]**

(Total 6 Marks)