Cell Structure and Organisation (Topic 3): Edexcel SNAB A Level Biology Exam Questions by Topic

20 questions · 49 marks · about 59 minutes. Answer in the spaces, then check the mark schemes at the end.

Question 1 · AS Paper 2 · June 2024 · Q2(a)(ii) · 1 mark

(ii) Name an organelle, other than the nucleus, that contains DNA.

(1)

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Question 2 · AS Paper 2 · June 2024 · Q2(a)(iii) · 2 marks

(iii) Describe the organisation of DNA in the nucleus of a eukaryotic cell.

(2)

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Question 3 · AS Paper 2 · June 2024 · Q2(b)(i) · 3 marks

(b) The ribosomes in both prokaryotic and eukaryotic cells are involved in protein synthesis.

The photograph shows a Golgi apparatus found in eukaryotic cells.



(Source: Aldona Griskeviciene / Shutterstock)

(i) Compare and contrast the structure of the Golgi apparatus with the structure of the rough endoplasmic reticulum (rER).

(3)

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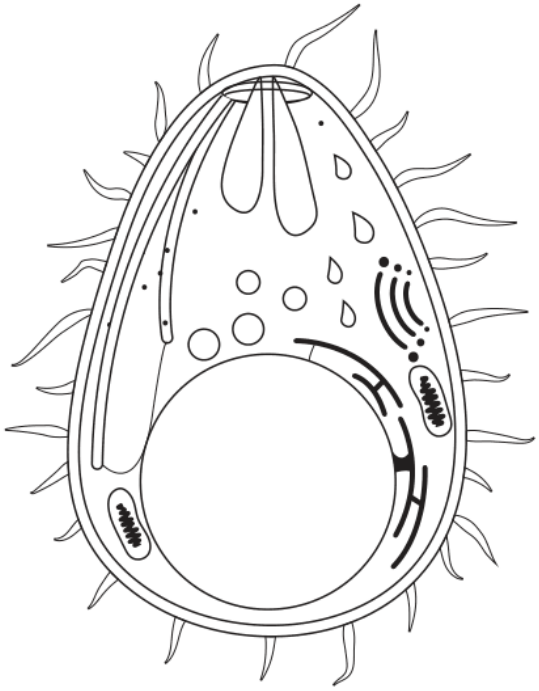
Question 4 · A level Paper 1 · June 2022 · Q4(a) · 2 marks

4 Malaria is a disease that kills more than 400 000 people every year.

It is caused by *Plasmodium*, a single-celled organism that lives in the blood.

Plasmodium is transmitted by mosquitoes.

The diagram shows a *Plasmodium* organism.



(a) State and justify two structures shown in the diagram that indicate that *Plasmodium* is a eukaryotic organism.

(2)

Question 5 · A level Paper 1 · June 2022 · Q6(a) · 2 marks

6 Leigh syndrome is a disease of the nervous system that affects the brain.

It is caused by a mutation in the DNA present inside mitochondria.

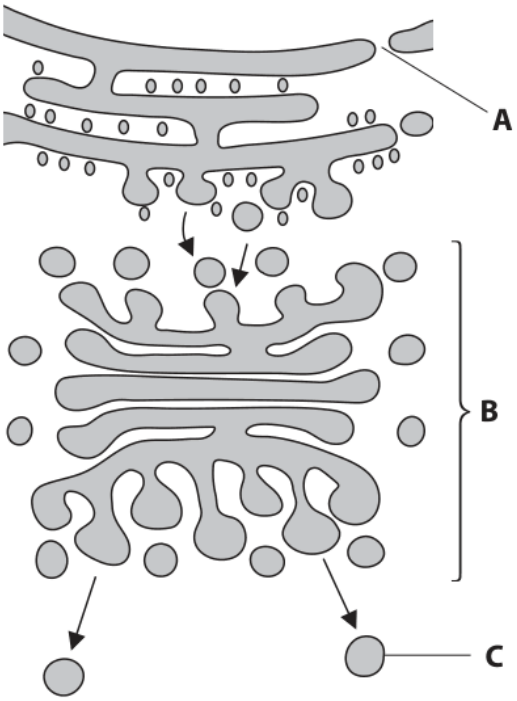
(a) Draw and label a mitochondrion.

(2)

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Question 6 · AS Paper 2 · June 2018 · Q2(a) · 3 marks

2 The diagram shows some of the cell organelles involved in the formation of extracellular enzymes.



(a) Name the parts of the cell labelled **A**, **B** and **C**.

(3)

A .....

B .....

C .....

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Question 7 · AS Paper 2 · June 2018 · Q2(b) · 4 marks

(b) Describe the roles of parts **B** and **C** in the formation and transport of extracellular enzymes.

(4)

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Question 8 · AS Paper 2 · June 2016 · Q7(b) · 4 marks

(b) Anti-freeze glycoprotein (AFGP) is one type of anti-freeze protein.

Messenger RNA coding for AFGP is translated at a ribosome to produce a polypeptide.

Describe how this polypeptide is then processed to make AFGP.

(4)

Question 9 · AS Paper 2 · June 2016 · Q2(c) · 2 marks

(c) There is no nucleus in a mature sieve tube element.

Give **two** reasons why a sieve tube element does not require rough endoplasmic reticulum and ribosomes.

(2)

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Question 10 · A level Paper 1 · June 2018 · Q3(c)(ii) · 2 marks

(ii) Interferon can be used to treat people with viral hepatitis.

Interferon can be made by animal cells or by genetically modified bacteria.

The table shows information about interferon made by these animal cells and genetically modified bacteria.

Source of interferon	Type of molecule	Folding	Antiviral activity
Animal cells	Glycoprotein	Correctly folded	High
Genetically modified bacteria	Protein	Incorrectly folded and needs to be refolded before it can be used	Low

Explain why the interferon made by genetically modified bacteria is different from the interferon made by animal cells.

(2)

Questions, mark schemes and examiners' report extracts © Pearson Education Ltd.

Question 11 · A level Paper 1 · October 2020 · Q1(b)(i) · 3 marks

(b) (i) Many of the proteins synthesised become extracellular enzymes.

Describe what happens to these proteins following the process of translation until they are released from the cell.

(3)

Questions, mark schemes and examiners' report extracts © Pearson Education Ltd.

Question 12 · A level Paper 1 · June 2024 · Q4(b)(ii) · 3 marks

(ii) Describe how the CFTR protein is transported from the ribosome to the cell membrane.

(3)

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Question 13 · A level Paper 2 · June 2025 · Q1(b) · 4 marks

(b) Acinar cells produce the digestive enzyme elastase. Elastase is secreted from the acinar cells as a glycoprotein.

The polypeptide chain for elastase is formed on the ribosomes of the rER.

Describe how this polypeptide is processed to form a glycoprotein and then released from the cell.

(4)

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Question 14 · AS Paper 2 · June 2019 · Q2(c)(ii) · 4 marks

(ii) Scientists took blood samples from infected red squirrels and analysed them using an electron microscope.

Describe the features that could be used to identify the prokaryotic cells in the blood sample.

(4)

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Question 15 · A level Paper 1 · June 2017 · Q3(a) · 3 marks

3 DNA synthesis in bacterial cell cultures has been investigated.

(a) Describe how DNA is organised in a bacterial cell.

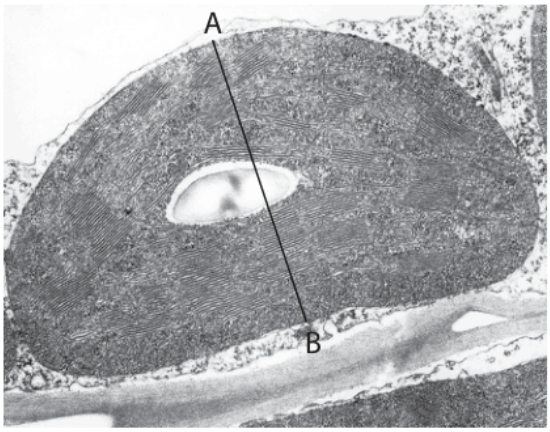
(3)

Questions, mark schemes and examiners' report extracts © Pearson Education Ltd.

Question 16 · AS Paper 2 · June 2025 · Q1(a)(i) · 2 marks

1 All living organisms are made of cells.

(a) The image shows an electronmicrograph of an organelle found only in eukaryotic cells.



(Source: © Omikron/SCIENCE PHOTO LIBRARY)

magnification ×44 000

(i) This organelle is not found in prokaryotic cells.

Explain why this type of organelle is present only in eukaryotic cells and **not** in prokaryotic cells.

(2)

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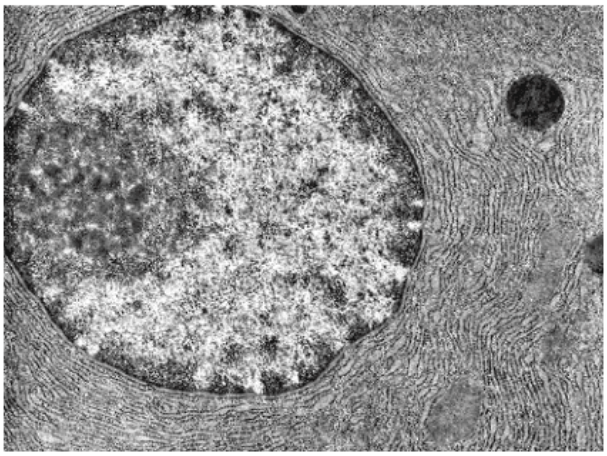
Question 17 · AS Paper 2 · November 2021 · Q1(a)(i) · 1 mark

1 An electron microscope can be used to identify organelles in eukaryotic cells.

(a) The photograph shows part of a eukaryotic cell.

(i) Label the nucleolus on the photograph.

(1)

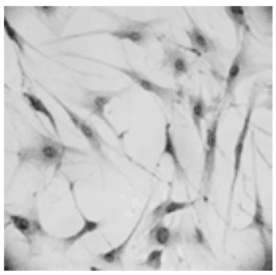


(Source: AL1379899 – Jose Luis Calvo / Shutterstock / PAL)

Question 18 · AS Paper 2 · June 2017 · Q7(a)(i) · 2 marks

7 In humans, different types of stem cell are found in the bone marrow.

The photograph shows some mesenchymal stem cells from bone marrow.



Mesenchymal stem cells can differentiate to give rise to a variety of cell types, including bone cells, cartilage cells, muscle cells and fat cells.

The skeletal system consists of bone tissue, muscle tissue and cartilage tissue.

(a) (i) Describe how a tissue differs in structure from a system.

(2)

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Question 19 · AS Paper 2 · June 2025 · Q3(a) · 1 mark

3 The leaves of the pineapple plant provide long fibres that can be used in the production of textiles.

The photograph shows fibres being extracted from pineapple leaves.



(Source: © Jahangir Alam Onuchcha/Shutterstock)

(a) Leaves are organs that contain tissues.

Give **one** difference between an organ and a tissue.

(1)

Question 20 · A level Paper 3 · June 2025 · Q1(b)(i) · 1 mark

(b) Species of *Lupinus* have organs called root nodules that contain bacteria.

Sugars and nutrients are exchanged between the plant and the bacteria in the root nodules.

(i) State what is meant by the term **organ**.

(1)

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Mark schemes

Question 1 · AS Paper 2 · June 2024 · Q2(a)(ii) · 1 mark

Question number	Answer	Additional guidance	Mark
2(a)(ii)	• mitochondrion / mitochondria/ chloroplast		(1)

Question 2 · AS Paper 2 · June 2024 · Q2(a)(iii) · 2 marks

Question number	Answer	Additional guidance	Mark
2(a)(iii)	An answer that makes reference to the following: • in chromosomes / as chromatin (1) • wrapped around histone (proteins) (1)		(2)

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Question 3 · AS Paper 2 · June 2024 · Q2(b)(i) · 3 marks

Question number	Answer
2(b)(i)	An answer that makes reference to three of the following: Similarity • both are composed of (flattened) stacks of membranes / both are composed of {cisternae / membrane bound sacs } (1) • both have vesicles (1) Difference • only the rER has ribosomes attached (1) • rER has interconnected sacs whereas these are separated in the Golgi apparatus (1) • the membranes of the rER are connected to the nuclear membrane (1)

Additional guidance	Mark
For full marks must have at least one similarity ALLOW both are made of flattened sacs	(3)

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Question 4 · A level Paper 1 · June 2022 · Q4(a) · 2 marks

Question Number	Answer
4(a)	An answer that makes reference to the following • *Plasmodium* contain two named organelles (1) • (they have) membrane bound organelles (1)

Additional guidance	Mark
Eg nucleus, mitochondria, Golgi {apparatus/body}, endoplasmic reticulum ALLOW prokaryotes do not contain membrane bound organelles	(2)

Question 5 · A level Paper 1 · June 2022 · Q6(a) · 2 marks

Question Number	Answer
6(a)	An answer that makes reference to the following • a drawing of a double membrane with folding of the inner membrane (1) • two parts correctly labelled (1)

Additional guidance	Mark
e.g. intermembrane space, cristae, matrix, inner membrane, outer membrane, ribosomes, DNA	(2)

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Question 6 · AS Paper 2 · June 2018 · Q2(a) · 3 marks

Question Number	Answer
2(a)	• (A) nuclear pore (1) • (B) Golgi { apparatus / body } (1) • (C) secretory vesicles / lysosome (1)

Additional Guidance	Mark
ALLOW rER / rough endoplasmic reticulum	(3)

Question 7 · AS Paper 2 · June 2018 · Q2(b) · 4 marks

Question Number	Answer
2(b)	A description which makes reference to the following: • {vesicles fuse with / protein enters} Golgi apparatus (1) • modification of protein inside Golgi apparatus (1) • {protein / enzyme} packaged into (secretory) vesicles (1) • vesicles fuse with cell (surface) membrane (1)

Additional Guidance	Mark
	(4)

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Question 8 · AS Paper 2 · June 2016 · Q7(b) · 4 marks

Question Number	Answer
7(b)	A description that makes reference to: • the polypeptide chain moves through the endoplasmic reticulum then the Golgi apparatus (1) • in the rER, the polypeptide is folded (1) • in the { Golgi apparatus / ER } carbohydrate is added (1) • the { polypeptide / protein } is transported around the cell in a vesicle (1)

Additional Guidance	Mark
This mark may be awarded from the sequence of the answer as a whole. ALLOW secondary structure / tertiary structure / three-dimensional shape is adopted in rER ALLOW sugar (group) for carbohydrate IGNORE exocytosis, secretion	(4)

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Question 9 · AS Paper 2 · June 2016 · Q2(c) · 2 marks

Question Number	Answer
2(c)	An answer that makes reference to the following: • there will be no { transcription / mRNA } (therefore ribosomes not required for translation) (1) • no proteins will be synthesised to be processed in endoplasmic reticulum (1)

Additional Guidance	Mark
ALLOW proteins are provided by/from the companion cell	(2)

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Question 10 · A level Paper 1 · June 2018 · Q3(c)(ii) · 2 marks

Question Number	Answer
3(c)(ii)	An explanation that makes reference to two of the following: • bacteria do not possess {rER / Golgi apparatus} (1) • polypeptide chain is not {processed / modified}properly (1) • therefore the protein is {incorrectly folded / carbohydrate is not added} (1)

Additional Guidance	Mark
ALLOW converse statements for each marking point ALLOW Golgi body ALLOW protein ALLOW is not glycosylated	**(2)**

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Question 11 · A level Paper 1 · October 2020 · Q1(b)(i) · 3 marks

Question Number	Answer
1(b)(i)	A description that makes reference to three of the following • the proteins are folded in the rough endoplasmic reticulum (RER) (1) • the proteins are {packaged into/transported in} vesicles (1) • the protein is modified in the Golgi apparatus (1) • exocytosis (1)

Additional guidance	Mark
ALLOW processed/description of modification ALLOW description of exocytosis	**(3)**

Question 12 · A level Paper 1 · June 2024 · Q4(b)(ii) · 3 marks

Question Number	**Answer**
4(b)(ii)	An answer that makes reference to the following • (from ribosome) moves to rER where it is { folded / takes tertiary structure } (1) • transported to Golgi apparatus where it is { modified / packaged into vesicles } (1) • vesicles fuse with { plasma / cell } membrane (inserting protein into membrane) (1)

Additional guidance	**Mark**
ALLOW 3D shape IGNORE binds IGNORE exocytosis	(3)

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Question 13 · A level Paper 2 · June 2025 · Q1(b) · 4 marks

Question Number	Answer
1 (b)	A description that makes reference to four of the following: • (the polypeptide) { is folded / forms 3D shape / folds into globular shape / tertiary structure is formed } in the rER (lumen) (1) • transported to Golgi apparatus in vesicles (from rER) / vesicles fuse with Golgi apparatus (1) • addition of carbohydrate in Golgi apparatus (1) • packaged into (secretory) vesicles by Golgi apparatus (1) • exocytosis (1)

Additional Guidance	Mark
Do not allow reference to this happening at or on the rER ALLOW sugar, glucose, disaccharide for carbohydrate IGNORE glycogen ALLOW description of exocytosis as fusing of membranes of vesicle with cell surface membrane	**(4)**

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Question 14 · AS Paper 2 · June 2019 · Q2(c)(ii) · 4 marks

Question Number	Answer	Additional Guidance	Mark
2(c)(ii)	A description that makes reference to four of the following: • presence of a cell wall (1) • circular DNA / plasmids (1) • {small / 70S} ribosomes (1) • pili / flagellum (1) • capsule / mesosome (1)		(4)

Question 15 · A level Paper 1 · June 2017 · Q3(a) · 3 marks

Question Number	Answer
3(a)	A description that makes reference to three of the following: • (large) circular DNA (1) • DNA not associated with histone proteins (1) • (small / several) plasmids (1) • located in the cytoplasm / not inside a nucleus (1)

Additional Guidance	Mark
ALLOW nucleoid NOT two marks for plasmids are circular DNA	3

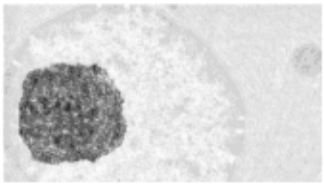
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Question 16 · AS Paper 2 · June 2025 · Q1(a)(i) · 2 marks

Question number	Answer
1(a)(i)	An explanation that makes reference to the following: • (because) it is { a chloroplast /membrane bound } (1) • prokaryotic cells do not have membrane-bound organelles / only eukaryotic cells have membrane bound organelles (1)

Additional guidance	Mark
ALLOW mark for membrane bound if organelle incorrectly identified ALLOW (photosynthetic) prokaryotes use folded cell membrane for photosynthesis IGNORE cell (membrane)?	(2)

Question 17 · AS Paper 2 · November 2021 · Q1(a)(i) · 1 mark

Question Number	Answer	Additional guidance	Mark
1(a)(i)	• nucleolus correctly labelled	 within area shown	**(1)**

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Question 18 · AS Paper 2 · June 2017 · Q7(a)(i) · 2 marks

Question Number	Answer
7(a)(i)	A description that makes reference to the following: • tissue contains one type of cell **(1)** • a system contains (many) {different tissues /organs} **(1)**

Additional Guidance	Mark
ALLOW similar cells	**(2)**

Question 19 · AS Paper 2 · June 2025 · Q3(a) · 1 mark

Question number	Answer
3(a)	An answer that makes reference to the following: • an organ is made of { more than one type of tissue / different tissues }

Additional guidance	Mark
	(1)

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Question 20 · A level Paper 3 · June 2025 · Q1(b)(i) · 1 mark

Question number	Answer
1(b)(i)	An answer that makes reference to the following: • group of (different) tissues that work together to carry out a (specific) function

Additional guidance	Mark
ALLOW functions plural / job / role / task / process DO NOT ALLOW similar tissues	(1)

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