Cell Structure
Multiple Choice

Model Answers 1

Level	A Level
Subject	Biology
Exam Board	OCR
Module	Foundations in Biology
Topic	Cell Structure
Booklet	Model Answers 1

Time allowed: **19 minutes**

Score: **/14**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E
>69%	56%	50%	42%	34%	26%

Question 1

Which organelle, **A** to **D**, is **not** involved in the production and secretion of enzymes in eukaryotes?

[1]

A. golgi apparatus

B ribosomes

C smooth endoplasmic reticulum

D vesicle

Ribosomes make the protein, then the Golgi modifies the protein which is transported to the membrane in a vesicle. The smooth endoplasmic reticulum makes lipids not proteins

Question 2

The bacterium *Sorangium cellulosum* and the fungus *Armillaria mellea* are both found in soil.

Which of the rows, **A** to **D**, correctly shows the structures present in each organism? **[1]**

	Free ribosomes in cytoplasm	Membrane bound nucleus	DNA in a single loop	Cell wall present
A	*S. cellulosum* and *A. mellea*	*A. mellea*	*S. cellulosum*	*S. cellulosum* and *A. mellea*
B	*S. cellulosum* and *A. mellea*	*A. mellea*	*S. cellulosum* and *A. mellea*	*S. cellulosum* and *A. mellea*
C	*S. cellulosum*	*S. cellulosum* and *A. mellea*	*S. cellulosum*	*A. mellea*
D	*A. mellea*	*S. cellulosum*	*S. cellulosum* and *A. mellea*	*S. cellulosum*

Both have ribosomes in the cytoplasm

Only fungi have a membrane bound nucleus

Bacteria have plasmids fungi do not

Both have cell walls. Fungal is made of chitin and bacteria made of peptidoglycan

Question 3

Which of the following best describes a microscope with *high resolution*?

A. The microscope can distinguish structures that are very close together.

B. The microscope can view structures that are very small.

C. The microscope is capable of high magnification.

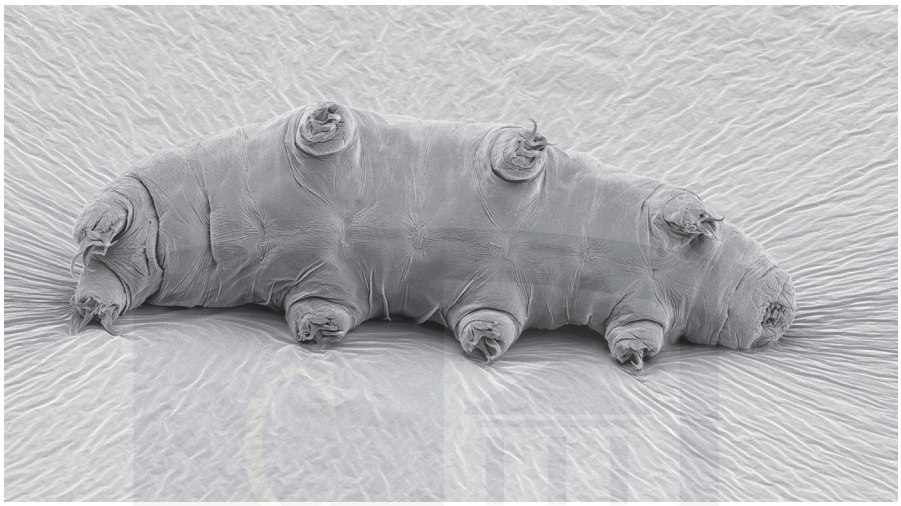
D. The microscope has an in-built eyepiece graticule.

[1]

Resolution is the ability to separate points which are close together. The light microscope has lower resolution than an electron microscope as the wavelength of light is longer

Question 4

The image below shows a tardigrade, *Echiniscus granulatus*, viewed from the underneath. The magnification is ×110.



How long is the tardigrade in real life?

A 115 μm

B 1.14×10^{-5} m

C 8.64×10^{-4} m

D 0.116mm

[1]

The tardigrade is 95mm long on the photograph (may be a discrepancy on the image size)

So it is x110 bigger than it actually is which is therefore 0.86mm

Or 8.6×10^{-4} m

Rather than put this into a formula just think logically about what you have to do

Question 5

Which of the options, **A** to **D**, occurs in the nucleus of a cell?

A. synthesis of enzymes

B. synthesis of RNA

C. modification of polypeptides

D. synthesis of carbohydrates

[1]

DNA is transcribed in the nucleus to RNA, which is then small enough to leave the nucleus

Question 6

Microscopes vary in their magnification and resolution.

Which of the rows, **A** to **D**, in the table below is correct?

	Light microscope		Transmission electron microscope		Scanning electron microscope	
	Magnification	**Resolution (nm)**	**Magnification**	**Resolution (nm)**	**Magnification**	**Resolution (nm)**
A	× 1500	200	× 10000	0.2	× 50000	0.2
B	× 400	100	× 500000	10.0	× 100000	0.2
C	× 1500	200	× 500000	0.2	× 100000	0.2
D	× 1500	100	× 500000	10.0	× 100000	10.0

[1]

Resolution is the ability to separate points which are close together. The resolution of the light microscope is low as the wavelength of light is low.

Question 7

Which of the following structures, **A** to **D**, are found in prokaryotes **and** in eukaryotes?

A. a cell wall made of peptidoglycan

B. circular genomic DNA

C. a nucleus surrounded by a nuclear membrane

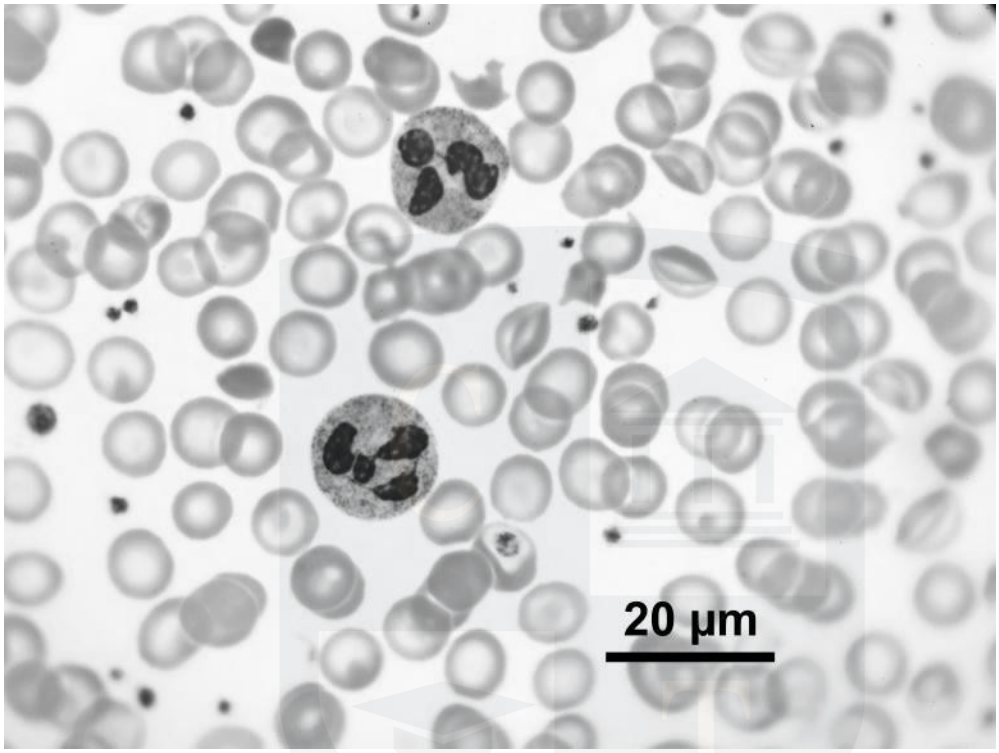
D. ribosomes

[1]

They both contain ribosomes but they are 70S in prokaryotes and 80S in eukaryotes

Question 8

Using the light micrograph below and the formula $\frac{4}{3}\pi r^3$ what is the volume of a neutrophil?



A 2 µm^3

B 20 µm^3

C 200 µm^3

D 2000 µm^3

[1]

Using the scale one neutrophil is about 16µm so the radius is half of this, 8µm

$R^3 = 8 \times 8 \times 8 = 512$

512 x 3.14 (π) x4 = 6430 ÷ 3 = 2143.

The nearest to this is D.

Question 9

Three types of microscope are listed below.

Select the row that shows the correct use for each type of microscope.

	Type of microscope and what it is used to observe		
	Light microscope	**Transmission electron microscope**	**Laser scanning confocal microscope**
A	an object at a certain depth within a cell	cell surfaces	organelles
B	an object at a certain depth within a cell	cell surfaces	whole cells and tissues
C	whole cells and tissues	organelles	cell surfaces
D	whole cells and tissues	organelles	an object at a certain depth within a cell

[1]

It's either C or D

Scanning electron microscopes view cells which have been fragmented and broken across the line of least resistance (like cutting a brick with a chisel) So D is the answer.

Question 10

Cyanobacteria are photoautotrophs and fossil records confirm their existence 3.5 billion years ago.

Which row describes the structure of cyanobacteria?

	Feature					
	Nucleus	**Circular DNA**	**Mitochondria**	**Ribosomes**	**Chloroplast**	**Cell wall**
A	✓		✓		✓	
B			✓		✓	✓
C	✓	✓		✓		
D		✓		✓		✓

[1]

Cyanobacteria are prokaryotes so do not have complex membrane-bound structures such as mitochondria or chloroplasts. They do possess internal thylakoid membranes which is where the reactions of photosynthesis (in the day) and respiration (at night) occur.

Question 11

Fig. 8.1 shows an animal cell.

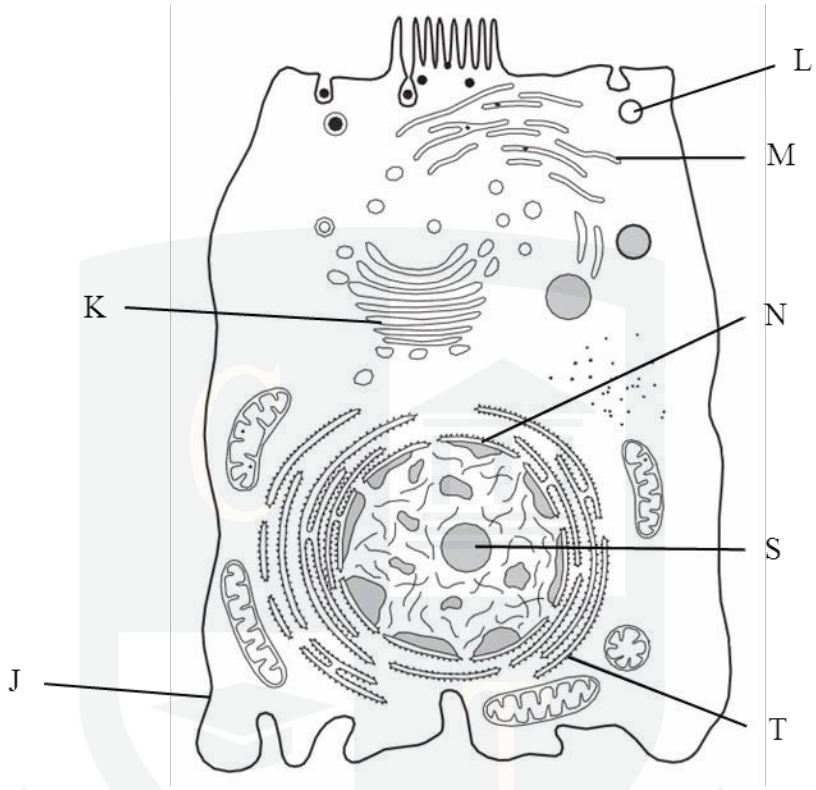


Fig. 8.1

Which option describes the correct sequence of organelles involved during the production and secretion of a protein from this cell?

A S, K, L, J **B** T, K, L, J **C** T, M, L, J **D** S, T, K, L

[1]

Proteins are made on the rough ER which is T, transferred to the Golgi where they are packaged K, transported in a secretory vesicle L which fuses with the cell surface membrane J.

You have to look for J as it's not obvious!

Question 12

Which of the following statements is/are true?

Statement 1: Microtubules are part of the '9 + 2' formation in bacterial flagella.

Statement 2: Microtubules can be prevented from functioning by a respiratory inhibitor.

Statement 3: Microtubules are involved in moving chromosomes from the equator to the poles of the cell during mitosis.

A 1, 2 and 3

B Only 1 and 2

C Only 2 and 3

D Only 1

[1]

Microtubules are part of the cytoskeleton, they need energy from respiration to move and are responsible for moving organelles around the cell and moving chromosomes

Question 13

A range of microscopes are available for scientific research. Each type of microscope has a different use.

Select the row that shows the correct uses for all the types of microscope.

	Type of microscope and what it is used to observe			
	Light microscope	**Transmission electron microscope**	**Scanning electron microscope**	**Laser scanning confocal microscope**
A	an object at a certain depth within a cell	organelles	cell surfaces	whole cells and tissues
B	cell surfaces	an object at a certain depth within a cell	whole cells and tissues	Organelles
C	whole cells and tissues	organelles	cell surfaces	an object at a certain depth within a cell
D	organelles	an object at a certain depth within a cell	whole cells and tissues	cell surfaces

[1]

Straight away you should realise the significance of 'whole cells and tissues'. The rest of the answer should confirm your answer

Question 14

Which of the following statements describes an organelle which is **not** membrane bound?

A. contains cristae

B. modifies and packages proteins

C. contains digestive enzymes

D. is made of rRNA and protein

[1]

D is referring to a ribosome