



2024

Unit 1 & 2 Biology

Unit 1

Exam Preparation Booklet

Name: \_\_\_\_\_

### **Unit 1 Biology Exam Structure:**

**Part A** – Consists of Multiple-Choice Questions

- There is 1 correct answer per question
- Each question is worth 1 mark

**Part B** - Consists of Short Answer Questions

- Write in the spaces allocated, if you run out of space, use the lines at the back of the exam booklet. If you need to do this, write in the exam booklet question to turn to back of the booklet and at the back of the exam booklet write the question number clearly
- Use the marks allocated for each question as a guide to how much detail is required in your response.

**Time:** 1 hr 45 min total

15 minutes reading time and 90 minutes writing time

# Topics covered in Unit 1:

## Area of Study 1

- Cells as the basic structures of life
- Similarities and differences between prokaryotic and eukaryotic cells
- Organelles – structure and function
- Similarities and differences in organelles between plant and animal cells
- Surface area to volume ratio and why cells are so small
- Plasma membrane structure and function
- Transport across the plasma membrane (osmosis, diffusion, facilitated diffusion and active transport)
- Binary fission – prokaryotic cell cycle
- The eukaryotic cell cycle its phases, checkpoints and sub-phases of mitosis
- Apoptosis – importance, stages and how malfunctions in apoptosis can lead to cancer
- Stem cells – definition and potency

## Area of Study 2

- Order of complexity from cells to systems
- Examples of plant and animal cells, tissues, organs and systems
- Vascular plant transport systems: Transpiration and Translocation
- Digestive system
- Excretory system
- Endocrine system
- Homeostasis and stimulus-response models
- Regulation of systems: thermoregulation, blood glucose levels & water balance

## Area of Study 3

There may be some questions relating to experimental report planning, conduction and analysis

## Additional things covered from Study Design

Ethics – integrity, justice, beneficence, non-maleficence, respect

# Cells

1.) Mrs Green characteristics of living things: identify and discuss

M

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S

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E

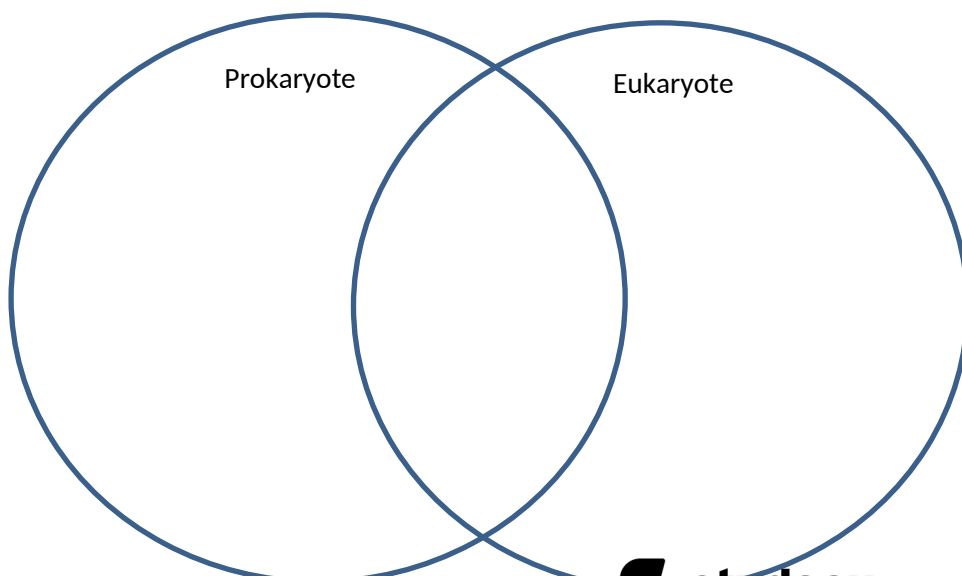
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2.) The three parts of the "cell theory"

3.) What do all cells have in common?

4.) Differences and similarities between prokaryotic and eukaryotic cells



## **Organelles**

5.) Write functions for the following organelles

**Cell membrane -**

**Nucleus -**

**Mitochondria -**

**Ribosome -**

**Rough endoplasmic reticulum -**

**Smooth endoplasmic reticulum -**

**Golgi body -**

**Chloroplast -**

**Lysosome -**

**Vacuole -**

**Cell wall -**

The following organelles are still relevant but have less emphasis in year 11 Biology content.

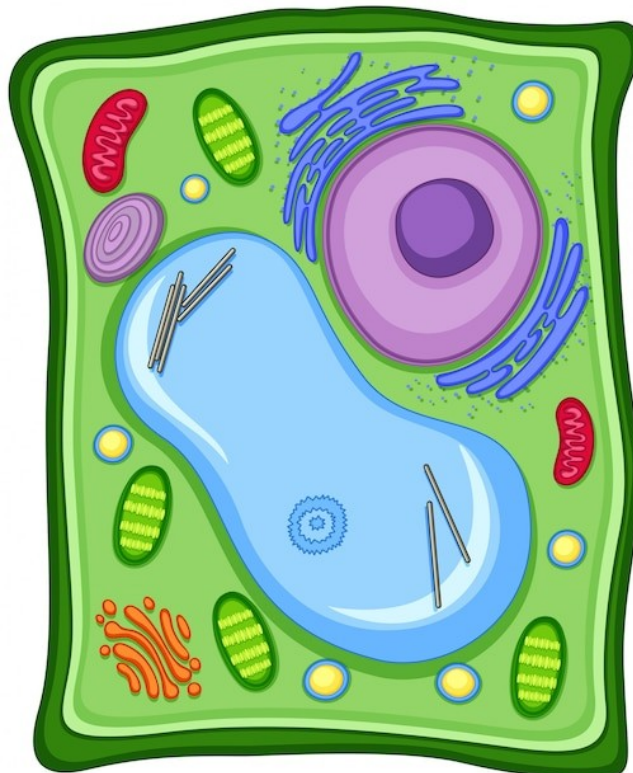
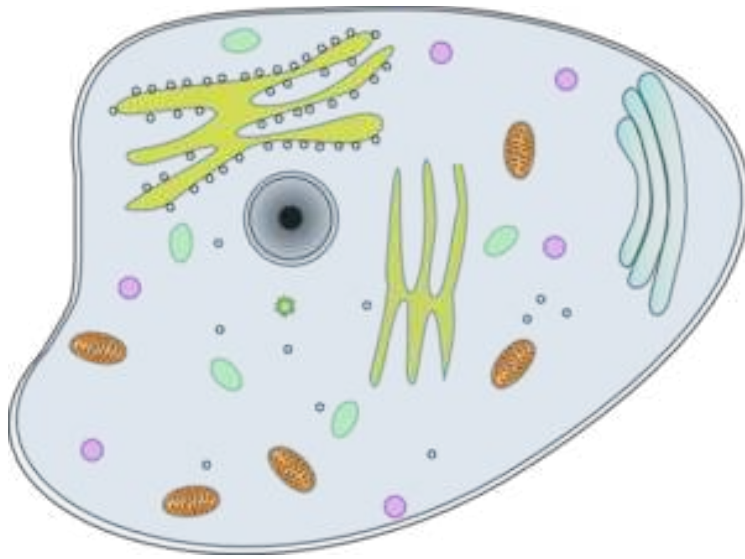
**Cytoskeleton -**

**Centrioles (Centrosome) -**

**Nucleolus -**

## Plant and animal cells

6.) Label the plant and animal cells below



7.) Identify the structures that are different between plant and animal cells

Plant cells	Animal Cells

8.) Explain reasons for some of the key differences between plant and animal cells identified in question 7

## **Cells at work**

### **Surface area to volume ratio**

9.) Explain what is meant by the term “surface area to volume ratio” (SA:V)

10.) Explain the importance of SA:V in living things. Use examples in your explanation

11.) Explain how cell shape can have an effect on SA:V and draw an example.

## Cell membranes (Plasma membranes)

12.) Draw a labelled diagram of a phospholipid molecule in the space below.

13.) Explain why the plasma membrane is referred to as a phospholipid bilayer and how the nature of the phospholipid molecules allows it to form in this way. (*You may like to draw a diagram to help you explain this*)

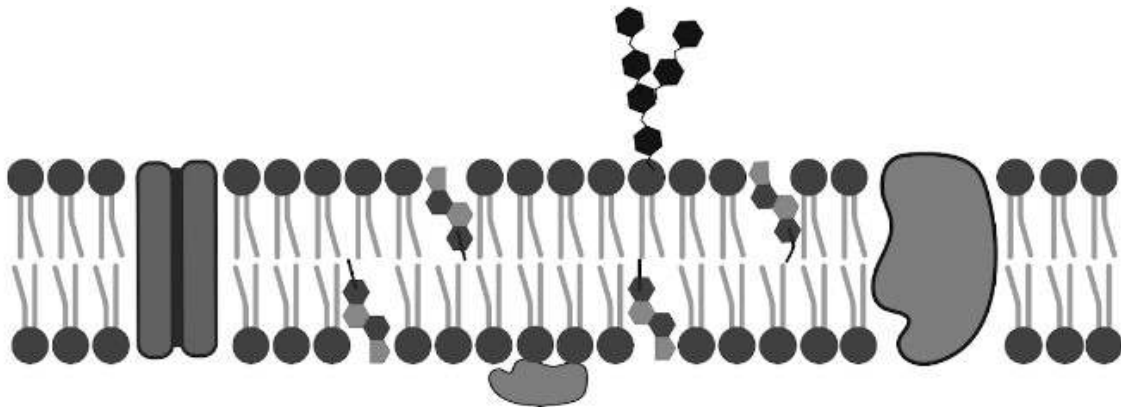
14.) Explain why the plasma membrane is described as “fluid and mosaic”

15.) Complete the table below by outlining the function of each part of the plasma membrane

Component of cell membrane	Role
Protein	
Cholesterol	
Carbohydrates	
Phospholipid bilayer	

16.) Label the diagram below with the following words:

*Phospholipid molecule, peripheral protein, transmembrane protein, integral protein, protein channel, cholesterol and glycolipid*



17.) Discuss the similarities and differences between a peripheral protein, integral protein and transmembrane protein.



18.) Explain the following processes and how they relate to plasma membrane function. You may like to use diagrams in your responses.

DIFFUSION

OSMOSIS

ACTIVE TRANSPORT

FACILITATED DIFFUSION

19.) Explain what is meant by the following terms with relation to osmosis:

Hypertonic solution:

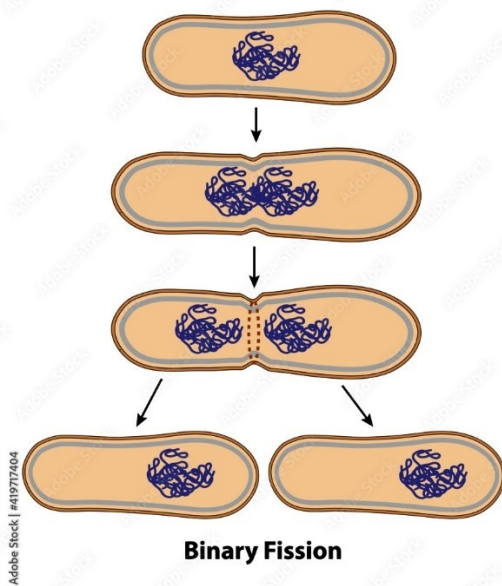
Hypotonic solution:

Isotonic solution:

20.) Explain the impact of these solutions on plant and animal cells. You may like to draw a diagram with your response.

## Binary Fission

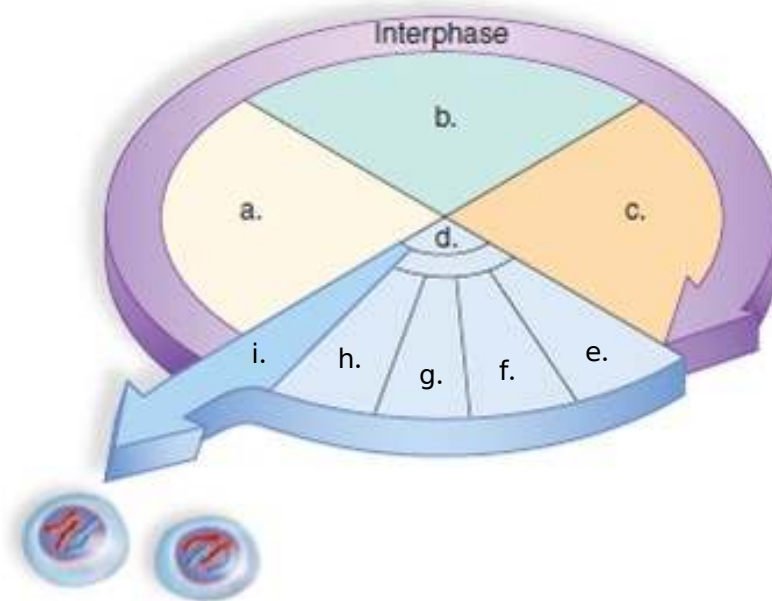
21.) Explain what is happening at each stage in the diagram pictured below



22.) Explain what binary fission is and why only prokaryotic organisms use this method of replication/reproduction.

## Cell Cycle

23.) Label the diagram pictured below



24.) Complete the table below by outlining the key phases of the cell cycle

Stage	Key events
a.	
b.	
c.	
d.	

25.) In which part of the cell cycle do cells spend most of their life in?

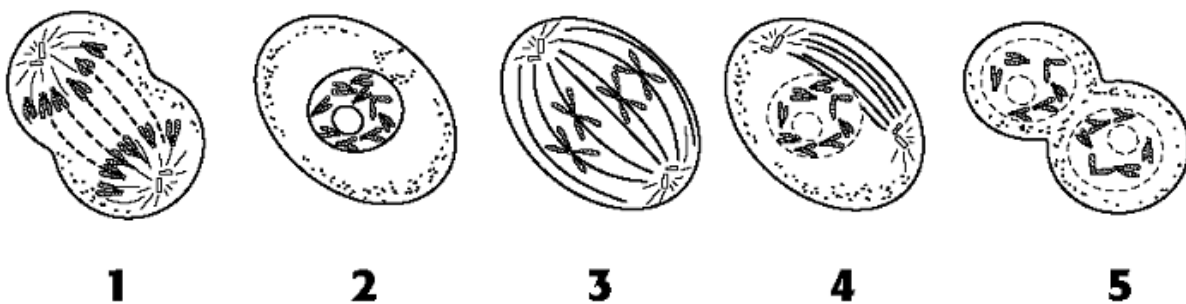
26.) List the checkpoints in the cell cycle and outline the role of each checkpoint

Checkpoint	Purpose	What can go wrong if check point fails

27.) Explain what is happening in each of the sub-phases of mitosis below.

Sub-Phase	What is happening?
Prophase	
Metaphase	
Anaphase	
Telophase	

28.) The diagram below shows the stages of mitosis. They are out of order. Your task is to identify the correct order



Correct order: i)

ii)

iii)

iv)

v)

# Apoptosis

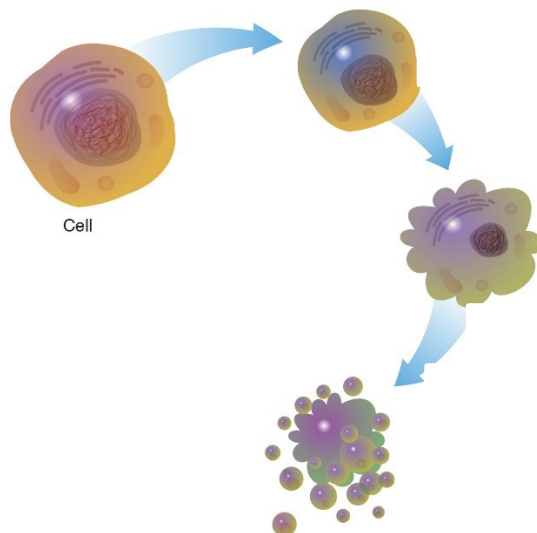
29.) Define the term apoptosis

30.) There are two pathways for apoptosis. Explain what they are and how they are different from each other.

Mitochondrial pathway -

Death receptor pathway -

31.) Explain what is happening in each stage of apoptosis in the diagram pictured below.



32.) Discuss necrosis and why apoptosis is preferred over necrosis.

33.) Explain how malfunctions in apoptosis can lead to cancer