

GRADE 11 | 2024 | PRACTICE EXAM

Life Sciences

PAPER 1

Time: 2.5 hours

Total: 150 marks

Paper 1 - Practice Exam

INSTRUCTIONS

- Answer ALL questions.
- Draw diagrams where instructed -- use pencil and label clearly.
- Answer in full sentences where required.
- Use correct scientific terminology.

QUESTION 1 [20 marks]

MULTIPLE CHOICE -- Circle the correct letter. (2 marks each)

- 1.1 The phase of mitosis where chromosomes align at the equatorial plate: A) Prophase B) Anaphase C) Metaphase D) Telophase
- 1.2 Which process produces four genetically unique haploid cells: A) Mitosis B) Binary fission C) Meiosis D) Budding
- 1.3 The vascular tissue that transports water and minerals upward: A) Phloem B) Cambium C) Xylem D) Epidermis
- 1.4 Which is a decomposer: A) Lion B) Eagle C) Earthworm D) Mould
- 1.5 In the Calvin cycle, CO₂ is fixed to produce: A) ATP B) NADPH C) Glucose D) O₂
- 1.6 Photosynthesis takes place in the: A) Mitochondria B) Ribosome C) Nucleus D) Chloroplast
- 1.7 Guard cells are found in the: A) Root B) Leaf epidermis C) Stem xylem D) Flower
- 1.8 The scientific study of heredity is called: A) Ecology B) Taxonomy C) Genetics D) Cytology
- 1.9 The 10% rule in ecology refers to: A) Oxygen available B) Energy transferred between trophic levels C) Water cycle efficiency D) Population growth rate
- 1.10 During crossing over, genetic material is exchanged between: A) Sister chromatids B) Homologous chromosomes C) Daughter cells D) Centromeres

QUESTION 2 [35 marks]

CELL DIVISION

2.1 (8)

Study the diagram of a cell (candidates: draw a cell at METAPHASE of mitosis -- 6 pairs of chromosomes).

- (a) Label the following: spindle fibres, chromosomes, centrioles.
- (b) State whether this is a plant or animal cell. Justify.

2.2 (10)

Complete the table comparing Mitosis and Meiosis:

Characteristic	Mitosis	Meiosis
Number of divisions	_____	_____
Cells produced	_____	_____
Chromosome number (daughter cell)	_____	_____
Genetic variation in products	_____	_____
Location in body	_____	_____

2.3 (7)

Explain the significance of CROSSING OVER in meiosis. Refer to biodiversity in your answer.

2.4 (5)

Why must the chromosome number be halved in gametes? What would happen if it were not?

2.5 (5)

Name FOUR phases of mitosis in the correct order and describe ONE visible event in each.

QUESTION 3 [35 marks]
PHOTOSYNTHESIS AND PLANTS
3.1 (4)

Write the overall equation for photosynthesis using chemical symbols.

3.2 (4)

Name the TWO stages of photosynthesis and state WHERE in the chloroplast each occurs.

3.3 (10)

Describe an experiment to investigate the effect of LIGHT INTENSITY on the rate of photosynthesis.

Include: hypothesis, method (including how you will measure the rate), expected results.

3.4 (6)

Explain how guard cells control the opening and closing of stomata.

3.5 (6)

Explain the COHESION-TENSION theory of water transport in plants.

3.6 (5)

State TWO differences between a xerophyte and a hydrophyte.

QUESTION 4 [30 marks]**ECOLOGY****4.1 (10)**

Study the food web (candidates: draw your own food web with grass, rabbit, fox, eagle, mouse, snake).

- (a) List all PRODUCERS.
- (b) Name an organism that is both a primary and secondary consumer.
- (c) What would happen to the fox population if all rabbits were removed? Explain.

4.2 (8)

Distinguish between the CARBON CYCLE and the NITROGEN CYCLE. In your answer, name TWO processes involved in each cycle.

4.3 (7)

Explain the difference between LOGISTIC and EXPONENTIAL population growth. Sketch graphs to illustrate.

4.4 (5)

State FOUR human activities that threaten biodiversity. For each, suggest ONE mitigation strategy.

QUESTION 5 [30 marks]

ESSAYS (Answer ONE)

5.1 Option A (30)

Discuss PHOTOSYNTHESIS under the following headings:

- The importance of photosynthesis to life on Earth
- The two stages of photosynthesis and what happens in each
- Factors that affect the rate of photosynthesis and how each affects it

[30 marks]

OR

5.1 Option B (30)

Discuss CELL DIVISION under the following headings:

- The cell cycle (including interphase)
- The stages of mitosis and what happens in each
- Comparison of mitosis and meiosis: purpose, products, location
- The importance of controlled cell division (include consequences of uncontrolled division)

[30 marks]
