

# SMARTWIZ

## GRADE11 LIFE SCIENCE EXAM

**MARKS: 100**

**TIME: 2 HOURS**

**SCHOOL** \_\_\_\_\_

**CLASS (eg. 4A)** \_\_\_\_\_

**SURNAME** \_\_\_\_\_

**NAME** \_\_\_\_\_

MARKS	
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### Instructions for Learners:

- Read all instructions carefully before you begin the exam.
- Write your full name and student number clearly on the answer sheet/book.
- Answer all questions unless otherwise instructed.
- Show all your work/calculations where necessary.
- Write neatly and clearly.
- Use only a blue or black pen. Do not use correction fluid or tape.
- Electronic devices (calculators, cell phones, etc.) are not allowed unless explicitly permitted.
- Raise your hand if you have any questions.
- Do not talk to other learners during the exam.
- Any form of cheating will result in immediate disqualification from the exam.

**This exam consists of six pages, including the cover page.**

## ● SECTION A: SHORT QUESTIONS (20 MARKS)

### QUESTION 1: MULTIPLE CHOICE ( $5 \times 1 = 5$ marks)

Choose the correct letter (A–D) for each:

1.1 The main nitrogenous waste in humans is:

- A) Urea
- B) Glucose
- C) Ammonia
- D) Salt

1.2 Which structure in the nephron is responsible for filtration?

- A) Loop of Henle
- B) Collecting duct
- C) Glomerulus
- D) Distal tubule

1.3 The hormone that regulates glucose levels is:

- A) Adrenaline
- B) Estrogen
- C) Insulin
- D) Testosterone

1.4 Which blood vessel carries oxygenated blood from the lungs to the heart?

- A) Pulmonary artery
- B) Pulmonary vein
- C) Aorta
- D) Vena cava

1.5 A biome with low rainfall and extreme temperatures is:

- A) Forest
- B) Tundra
- C) Desert
- D) Grassland

### QUESTION 2: MATCHING ITEMS ( $5 \times 1 = 5$ marks)

Match Column A with Column B.

Column A	Column B
2.1 Capillary	A. Filters blood in the kidney
2.2 Bile	B. Smallest blood vessel
2.3 Bowman's capsule	C. Involved in breaking down fat
2.4 Pancreas	D. Produces insulin
2.5 Synapse	E. Gap between two nerve cells

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**QUESTION 3: DEFINE ( $5 \times 2 = 10$  marks)**

3.1 Homeostasis

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3.2 Active transport

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3.3 Biodiversity

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3.4 Antibody

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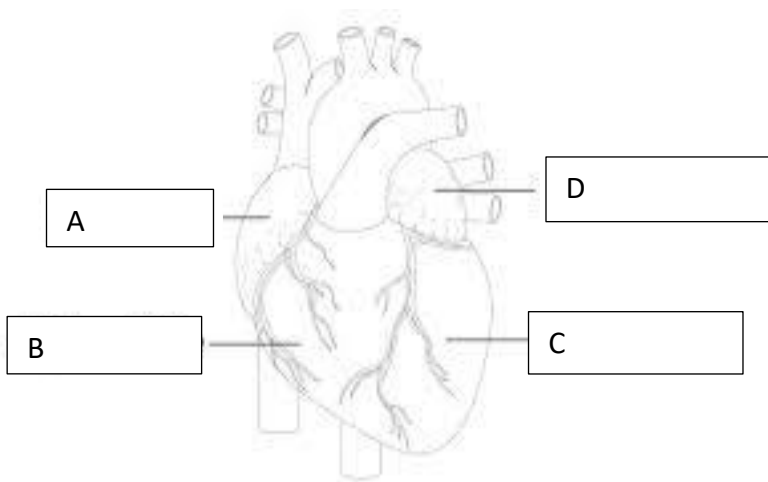
3.5 Excretion

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● **SECTION B: DATA, DIAGRAMS & APPLICATION (30 MARKS)**

**QUESTION 4: CIRCULATORY SYSTEM (10 marks)**



Look at the simplified diagram of the human heart ( visual with 4 chambers labeled A–D).

4.1 Label chambers A and C.

A: \_\_\_\_\_

C: \_\_\_\_\_

4.2 Which part pumps oxygenated blood to the body?

\_\_\_\_\_

4.3 Name one valve found in the heart.

\_\_\_\_\_

4.4 State ONE difference between arteries and veins.

\_\_\_\_\_

4.5 Give TWO functions of the circulatory system.

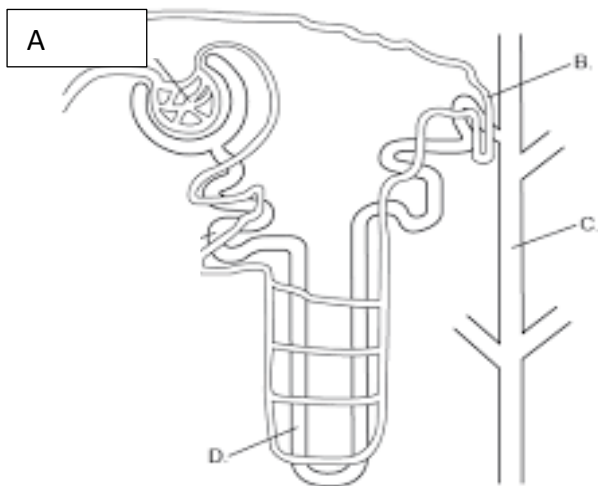
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### QUESTION 5: KIDNEY FUNCTION (10 marks)

A diagram shows a nephron with parts labeled A–D.



5.1 Name the part responsible for:

a) Filtration → \_\_\_\_\_

b) Water reabsorption → \_\_\_\_\_

5.2 What would happen if the collecting duct stopped functioning?

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5.3 Name TWO substances that are reabsorbed into the blood.

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5.4 What is the role of ADH in kidney function?


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### QUESTION 6: CLIMATE & BIOMES (10 marks)

Study the climate data below for a biome:

 Average Temp (°C): Jan – 30 / Apr – 25 / Jul – 22 / Oct – 27

 Rainfall (mm) : Jan – 20 / Apr – 10 / Jul – 5 / Oct – 15

6.1 What is the likely biome?

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6.2 Suggest TWO animal adaptations to this biome.

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6.3 Why is plant life in this biome typically sparse?

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6.4 Explain how climate affects biodiversity in this region.

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## ● SECTION C: ESSAY (30 MARKS)

### QUESTION 7: ESSAY – ENDOCRINE SYSTEM & HOMEOSTASIS

**Topic:**

**"Explain how the endocrine system helps maintain homeostasis in the human body. Include at least TWO examples of hormones and describe their effects."**

**Guidelines:**

- Define endocrine system
  - Mention glands and hormones
  - Explain hormone actions (e.g., insulin, ADH)
  - Link to homeostasis
  - Give clear examples and a conclusion
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● **END OF PAPER**  
**TOTAL: 100 MARKS**



**MEMO****● SECTION A: SHORT QUESTIONS (20 MARKS)****QUESTION 1: MULTIPLE CHOICE ( $5 \times 1 = 5$  marks)**

- 1.1 A – Urea
- 1.2 C – Glomerulus
- 1.3 C – Insulin
- 1.4 B – Pulmonary vein
- 1.5 C – Desert

**[5 marks]**

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**QUESTION 2: MATCHING ITEMS ( $5 \times 1 = 5$  marks)**

- 2.1 B – Capillary
- 2.2 C – Bile
- 2.3 A – Bowman's capsule
- 2.4 D – Pancreas
- 2.5 E – Synapse

**[5 marks]**

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**QUESTION 3: DEFINITIONS ( $5 \times 2 = 10$  marks)**

- 3.1 **Homeostasis:** The process by which an organism maintains a stable internal environment.
- 3.2 **Active transport:** The movement of substances across a cell membrane using energy, usually against the concentration gradient.
- 3.3 **Biodiversity:** The variety of living organisms within a particular habitat or ecosystem.
- 3.4 **Antibody:** A protein produced by the immune system that recognizes and neutralizes pathogens.
- 3.5 **Excretion:** The removal of metabolic waste products from the body.

**[10 marks]**

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**● SECTION B: DATA, DIAGRAMS & APPLICATION (30 MARKS)****QUESTION 4: CIRCULATORY SYSTEM (10 marks)**

4.1 A – Right atrium  
C – Left ventricle  
**(2 marks)**

4.2 Left ventricle  
**(1 mark)**

4.3 Tricuspid or mitral valve (accept either)  
**(1 mark)**

4.4 Arteries carry blood away from the heart, under high pressure; veins carry blood toward the heart, under low pressure.  
**(2 marks)**

4.5

- Transports oxygen and nutrients
- Removes carbon dioxide and waste  
(Any two valid functions)  
**(2 marks)**

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### **QUESTION 5: KIDNEY FUNCTION (10 marks)**

5.1  
a) Glomerulus  
b) Loop of Henle  
**(2 marks)**

5.2 Water and salts wouldn't be properly balanced; body may become dehydrated or retain too much water.  
**(2 marks)**

5.3 Glucose, amino acids (any two valid)  
**(2 marks)**

5.4 ADH regulates water reabsorption in kidneys; increases water reabsorption when body is dehydrated.  
**(4 marks)**

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### **QUESTION 6: CLIMATE & BIOMES (10 marks)**

6.1 Desert  
**(1 mark)**

6.2



- Camouflage
  - Water storage in tissues
  - Burrowing during heat (any two valid)
- (2 marks)**

6.3 Due to low rainfall and extreme temperatures  
**(2 marks)**

6.4 Harsh climate limits plant growth, which in turn supports fewer herbivores and carnivores — thus, lower biodiversity.  
**(2 + 1 marks)**

**[10 marks]**

## ● SECTION C: ESSAY (30 MARKS)


### QUESTION 7: ESSAY – Endocrine System & Homeostasis

**Mark Allocation:**

Component	Marks
Definition of endocrine system	2
Mention of glands (e.g., pancreas, pituitary)	4
Description of hormone functions (e.g., insulin, ADH)	10
Explanation of homeostasis	4
Examples applied correctly	6
Logical structure, language, conclusion	4
<b>TOTAL</b>	<b>30</b>

**Key points to expect:**

- Endocrine system = collection of glands secreting hormones
- Pancreas releases insulin to lower blood sugar
- Pituitary releases ADH to control water balance
- Hormones act on target organs
- Maintains stable internal conditions (homeostasis)

 **TOTAL: 100 MARKS**