

Name: Answer key

Teacher: _____

PART A: MULTIPLE CHOICE

1. The removal of metabolic waste products from the body of a mammal is known as
 - a. Egestion
 - ☒ b. Excretion
 - c. Secretion
 - d. Defecation

2. The composition of urea in urine is
 - a. 0.5%
 - b. 1.5%
 - ☒ c. 2.0%
 - d. 4%

3. Which of the following is **not** a function of the kidneys?
 - a. Regulating the composition of the body fluid
 - b. Regulating the water balance of the body
 - ☒ c. Regulating the body temperature
 - d. Removing the excess salts

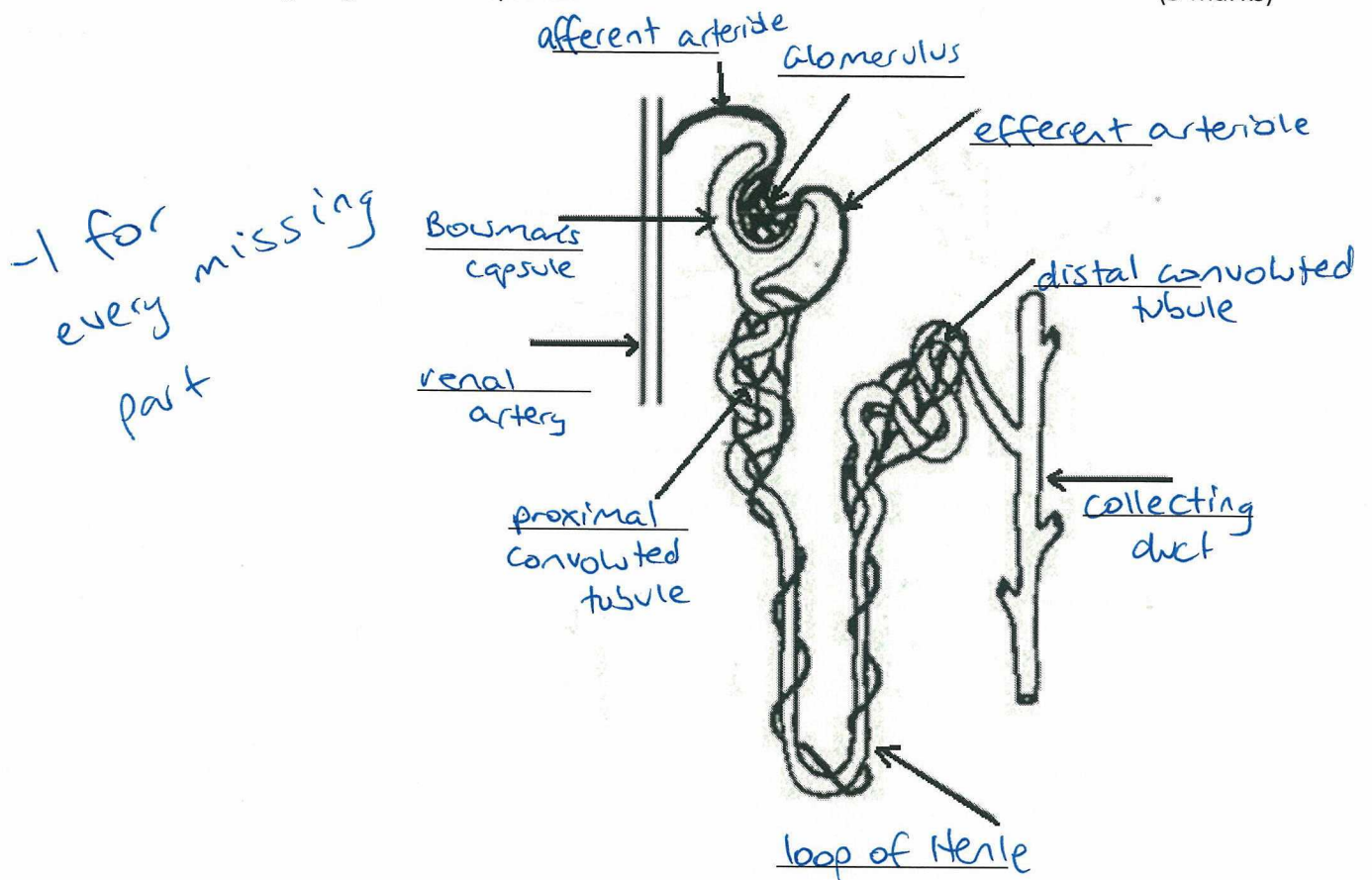
4. Normally, concentrations of metabolically **important** substances are:
 - ☒ a. High in the glomerular filtrate and low in urine
 - b. Low in the glomerular filtrate but high in urine
 - c. High in both the glomerular filtrate and urine
 - d. Low in both the glomerular filtrate and urine

5. Homeostasis is the mechanism by which the body maintains:
 - a. A dynamic physiological state within an unlimited range.
 - ☒ b. A relatively stable internal environment, within limits.
 - c. A static physiological state with no deviation from preset points.
 - d. The lowest possible usage of energy.

PART B: SHORT ANSWER

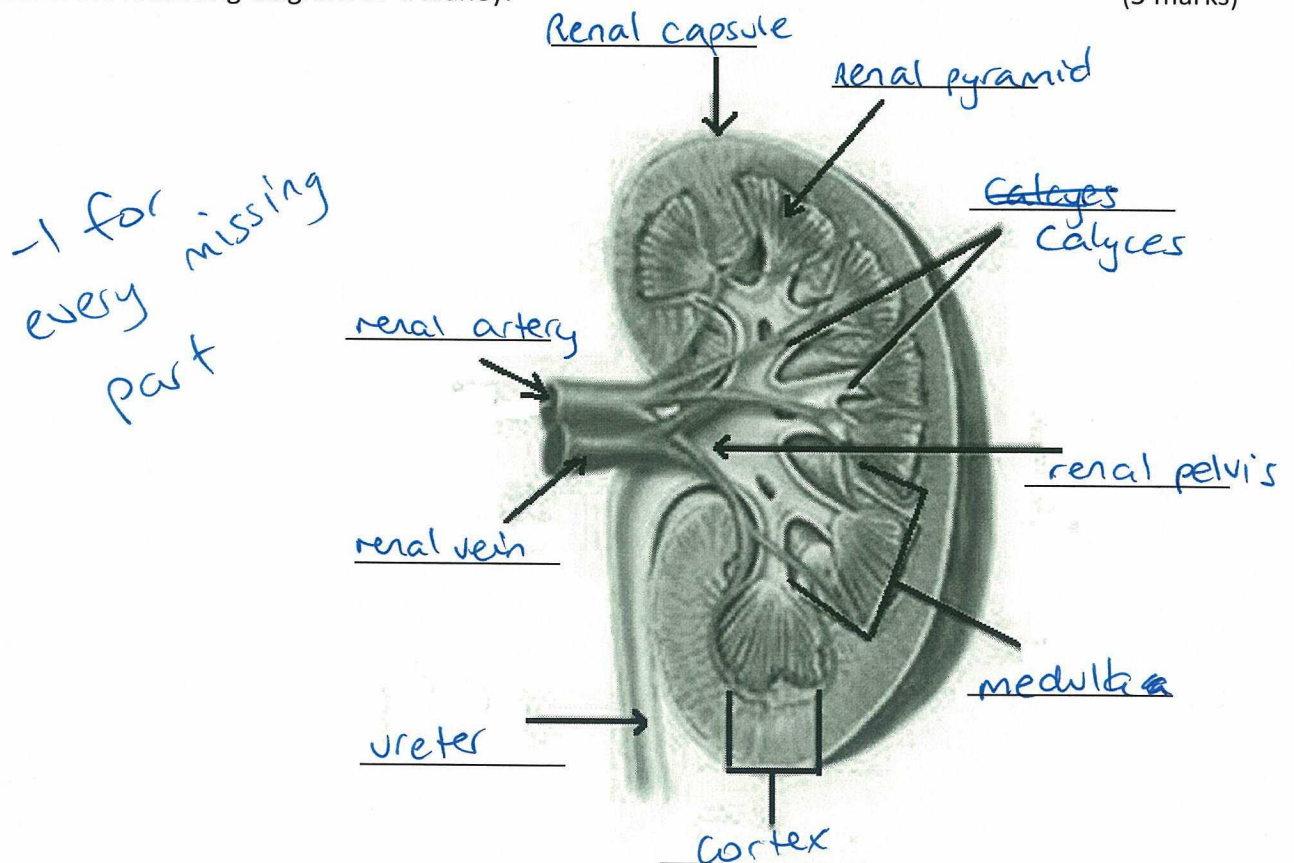
- 1) Label the following diagram of a nephron.

(5 marks)



- 2) Label the following diagram of a kidney.

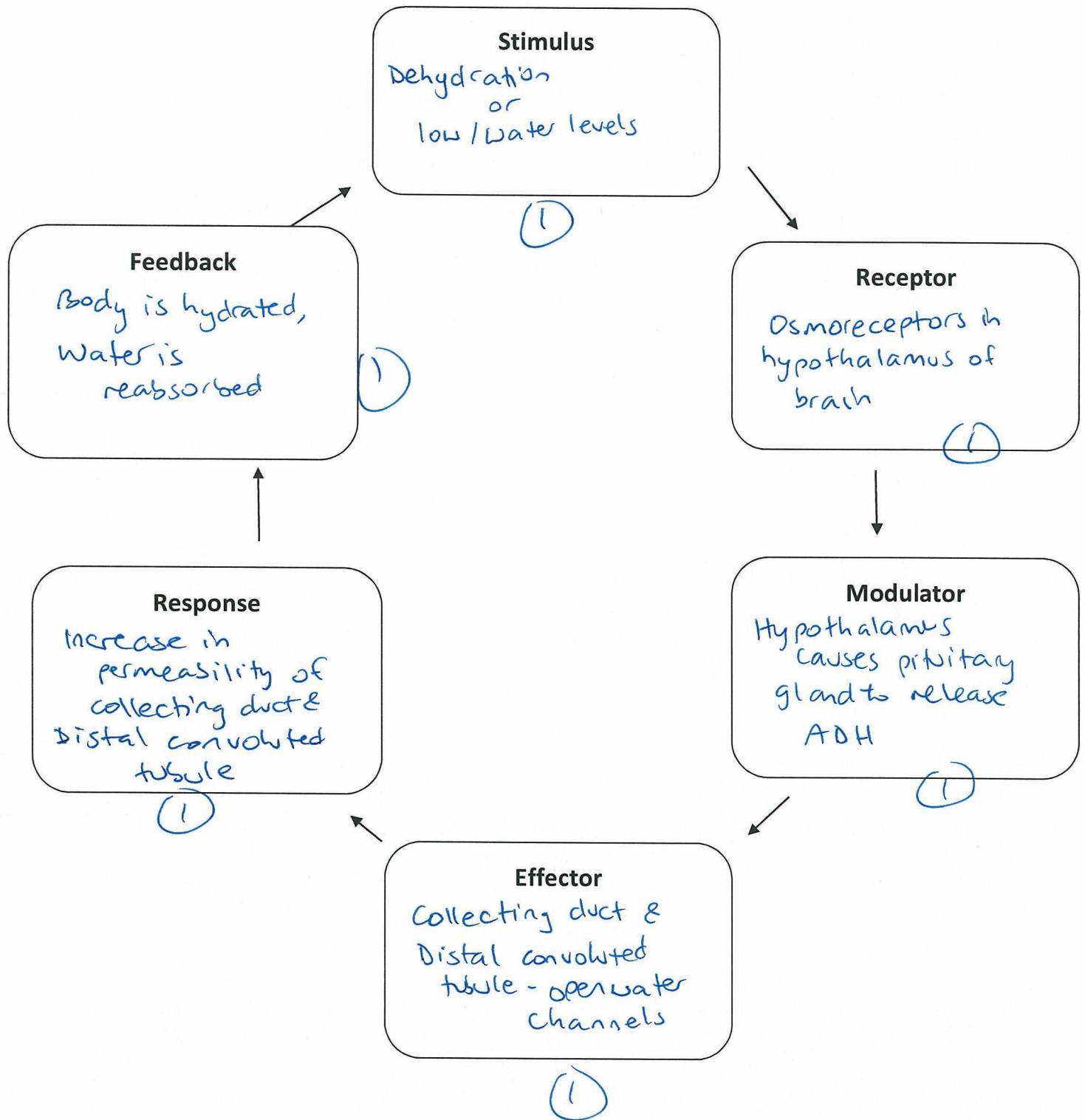
(5 marks)



3) Emir decided to go for a run around Lake Monger. He forgot to take his water bottle with him and began feeling a bit light headed and had a bit of a headache.

Complete the feedback loop to explain how Emir's body is dealing with dehydration.

(6 marks)



4) Complete the table below. Not all the boxes should be filled.

(10 marks)

Part of nephron	Substances being reabsorbed	Substances being filtered	Substances being secreted
Loop of Henle	<ul style="list-style-type: none"> - water - sodium ions - chloride ions 		
Collecting duct	Water		
Bowman's capsule		<ul style="list-style-type: none"> - Glucose - Phosphate ions - Glucose - amino acids - sodium ions - chloride ions - urea 	
Distal convoluted tubule	<ul style="list-style-type: none"> - water - sodium ions - chloride ions 		<ul style="list-style-type: none"> - Potassium ions - hydrogen ions - creatinine - Drug - Drugs like penicillin
Proximal convoluted tubule	<ul style="list-style-type: none"> - Sodium ions - Glucose - water - amino acids - chloride ions - phosphate ions - potassium ions 		

-1 mark for every two missing

5) Why can some substances pass through the membrane of the glomerulus, but others cannot?

Give 2 examples of substances that can pass through, and 2 substances that cannot. (5 marks)

① Some substances are too big to pass through the membrane.

- Examples of 2 substances that can pass through: (Any two)
H₂O, Glucose, amino acids, urea, sodium ions, chloride ions, phosphate ions ②

- Examples of 2 substances that cannot pass through:

- proteins, blood cells ②

6a) Explain how blood in the glomerulus kept under a high pressure.

(3 marks)

The afferent arteriole has a wider diameter (larger lumen) than the efferent arteriole leaving the glomerulus.

This means a large volume of blood can quickly enter the glomerulus but it is more difficult and slower for the blood to leave the glomerulus. ①
The renal artery is connected to the aorta. ①.

b) Why is it so important that this blood be kept under a high pressure?

(2 marks)

The blood pushes against the wall of the capillaries and forces small particles to move through the capillary walls through the membrane of the Bowman's capsule. ①

PART C: EXTENDED ANSWER

7) Raylene drank four cups of coffee, explain down **in detail** the effect this will have on the reabsorption of water in her body. You must include step by step details.

- Coffee is a diuretic (1)
- Drinking coffee causes ADH to stop being produced (1)
in the pituitary gland (1)
- The lack of ADH prevents the water channels
from opening up (1) (reduces permeability of tubule walls)
in the distal convoluted tubule (1)
and collecting duct (1).
- Water is therefore not reabsorbed back into
the blood but leaves the body in the urine (1)
- The urine is of high volume (1)
and low concentration (1)
- Raylene is left feeling dehydrated (1)

(10 marks)

8) Describe the process of protein deamination in the human body.

You must include step by step details.

- Proteins are made up of smaller molecules called amino acids (1)
- The body breaks down any amino acids that it no longer needs (1)
- Process occurs in the liver (1)
- The wastes made through deamination have nitrogen in them (1) and are called nitrogenous wastes (1).
- The first nitrogenous waste made by deamination is called ammonia (1)
- Ammonia is toxic (1)
- So the body converts it into urea (1)
- The body filters this waste (1) out at the kidneys (1) and removes it from the body.

(10 marks)