Unit 20 · Excretory System

WORKSHEET

Full marks 32

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 32

1 Key words [4]

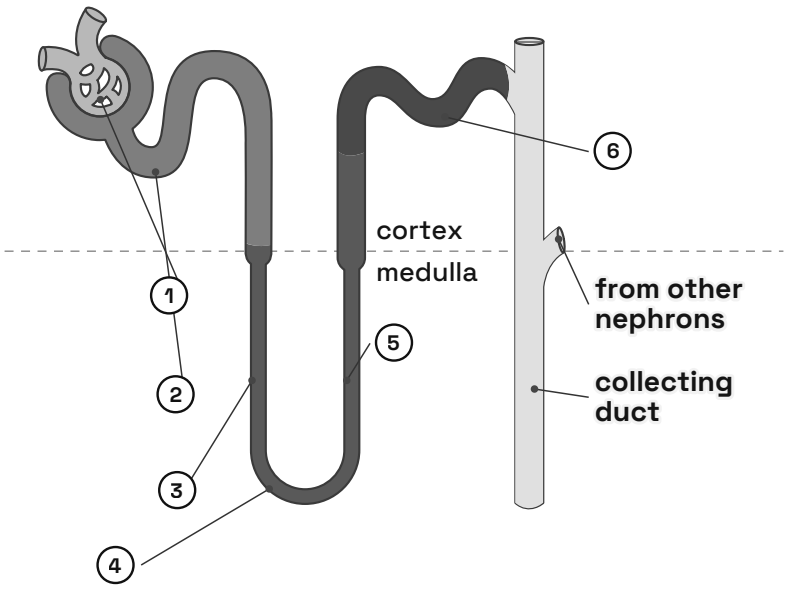
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

columns of Bertini	**detrusor**	**glomerular filtration rate**	**hilum**	**obligatory**	**podocytes**
retroperitoneal	**trigone**	**uricotelic**	**urochrome**		

Animals that pass out their nitrogen mainly as uric acid are _____. The kidneys lie behind the peritoneum: they are _____. The notch on the inner border of the kidney, where the ureter leaves, is the _____. The cells of the inner layer of Bowman's capsule, with foot-like branches, are the _____. The volume of filtrate formed by both kidneys in a minute is the _____. Water taken back in the PCT whatever the body's needs is _____ reabsorption. The smooth triangle on the inside of the bladder's base is the _____. The thick smooth muscle of the bladder that contracts to empty it is the _____ muscle.

2 Label the diagram [3]

The diagram shows one nephron, straightened out. Write the names of the parts 1 to 6. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____ **4.** _____

5. _____ **6.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. The human kidney is said to be retroperitoneal. What does this mean? [1]

a. it lies inside the peritoneal cavity, hanging from a fold
b. it lies behind the peritoneum, against the back wall of the abdomen
c. it lies in front of the stomach
d. it has no covering at all

ii. Which is the right order for urine leaving a nephron? [1]

a. collecting duct → duct of Bellini → calyx → renal pelvis → ureter
b. duct of Bellini → collecting duct → renal pelvis → calyx → ureter
c. collecting duct → calyx → duct of Bellini → ureter → renal pelvis
d. renal pelvis → calyx → duct of Bellini → collecting duct → ureter

iii. A tadpole is ammonotelic, but the adult frog is ureotelic. What best explains the change? [1]

a. the adult frog eats less protein
b. the adult spends time on land, where water can't be spared to wash ammonia away
c. urea is more toxic than ammonia
d. tadpoles have no kidneys

iv. After a hot day's work with little to drink, Bishal's urine is small in volume and dark. Which hormone has been at work? [1]

a. adrenaline
b. insulin
c. antidiuretic hormone (ADH)
d. thyroxine

v. The kangaroo rat of North America's deserts makes urine far more concentrated than ours. What would you expect to find in its kidneys? [1]

a. only cortical nephrons, with short loops
b. many juxtamedullary nephrons, with long loops reaching deep into a thick medulla
c. no loops of Henle at all
d. large glomeruli but no collecting ducts

4 Short answers [9]

Write short answers to the following questions.

a. Name the three layers that cover each kidney, from the inside out. [2]

b. Why is the afferent arteriole wider than the efferent arteriole? [2]

c. A doctor finds glucose in Anjali's urine. What does this tell her, and why is there no glucose in healthy urine? **[2]**

d. Write three differences between cortical and juxtamedullary nephrons. **[3]**

5 Numerical problem **[4]**

Show your working.

In Tsering's glomerulus the blood pressure is 60 mmHg, the colloid osmotic pressure of her blood 32 mmHg and the capsular hydrostatic pressure 18 mmHg.

a. Find her net filtration pressure.
b. Her GFR is 125 ml/min. How many liters of filtrate do her kidneys make in a day?
c. Tsering passes 1.8 liters of urine that day. What percentage of the filtrate was reabsorbed?

Answer:

6 Long answer **[4]**

Write a long answer to the following question.

Describe selective reabsorption in the different parts of the nephron.

7 Think [3]

After severe vomiting and diarrhea, a patient passes almost no urine. Use the pressures in the glomerulus to explain why.

8 Activity: The color of your urine (not marked)

Note the color of your urine first thing in the morning, after drinking two or three glasses of water, and on a hot afternoon when you have drunk little.

When	Color	Amount (a little / a lot)
first thing in the morning		
after drinking a lot of water		
on a hot afternoon, drinking little		

Which hormone makes the difference, and where does it act?